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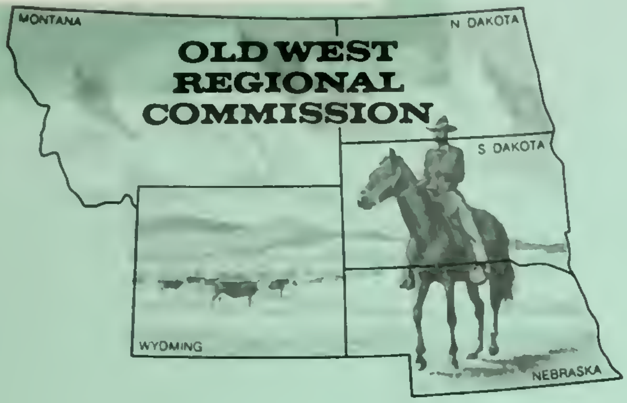

ENERGY RESEARCH INFORMATION SYSTEM

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Projects Report

Vol. 3, No. 1
August 1978

A Program of:

The Old West Regional Commission
Billings, Montana

in cooperation with

Argonne National Laboratory
U.S. Geological Survey
Oak Ridge National Laboratory
and
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****

THE ERIS STAFF IS CURRENTLY GATHERING NEW PROJECT INFORMATION FOR THE NEXT PUBLICATION OF ERIS. IF YOUR ORGANIZATION IS CONDUCTING ENERGY RELATED RESEARCH NOT YET INCLUDED IN ANY ERIS PROJECTS REPORT, PLEASE CONTACT ERIS FOR A REPORTING FORM.

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ENERGY RESEARCH INFORMATION SYSTEM

PROJECTS REPORT

Vol. 3, No. 1
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Old West Regional Commission
and
Argonne National Laboratory
U.S. Geological Survey
Oak Ridge National Laboratory
and
U.S. Dept. of Energy,
Technical Information Center

Billings, Montana
August 1978

COMPILED BY

Cathy Boyd and Laura Schillinger
Old West Regional Commission
228 Hedden-Empire Building
Billings, Montana 59101

IN COOPERATION WITH

Argonne National Laboratory
U.S. Geological Survey

WITH THE TECHNICAL ASSISTANCE OF

U.S. Dept. of Energy, Technical Information
Information Center

and

Dr. Gloria M. Caton
Julia B. Cooper
Regina McDuffie
Donna C. Michelson
Geraldine S. Danford
Lois M. Frogge
and
Bobbie-Neal Collier

of the Energy R&D Inventory
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37380

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TABLE OF CONTENTS

Introduction i

COAL AND COAL PRODUCTS 1

PETROLEUM 13

OIL SHALES AND TAR SANDS 15

FISSION FUELS 19

OTHER SYNTHETIC OR NATURAL FUELS 20

HYDRO ENERGY 21

SOLAR ENERGY 22

GEOTHERMAL ENERGY 29

WIND ENERGY 32

ELECTRICAL POWER ENGINEERING 34

ENERGY STORAGE 36

ENERGY MANAGEMENT AND POLICY 37

ENERGY CONVERSION 44

ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION 45

ENVIRONMENTAL SCIENCES, ATMOSPHERIC 48

TABLE OF CONTENTS (continued)

ENVIRONMENTAL SCIENCES, TERRESTRIAL 48

ENVIRONMENTAL SCIENCES, AQUATIC 53

ENVRIONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES 56

BIOMEDICAL SCIENCES, APPLIED STUDIES. 58

GEOSCIENCES 59

GENERAL AND MISCELLANEOUS 60

Location Index 61

Personal Name Index 62

Organization Index. 65

Subject Keyword Index 68

Permuted Title Index 75

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INTRODUCTION

The Energy Research Information System (ERIS) is a service administered by the Old West Regional Commission in response to the need for current information on research activities in the Region's rapidly growing and changing field of energy. Cooperating with the Commission on ERIS are the U.S. Geological Survey, Argonne National Laboratory, Oak Rige National Laboratory and U.S. Dept. of Energy, Technical Information Center.

The purpose of ERIS is to compile and make available to the energy research users of the Region an up-to-date inventory of ongoing and recently completed energy-related research projects. By providing researchers with a means of communication with other researchers and allowing government and policy decision-makers access to Regional energy research, ERIS aims to improve communication channels among energy research users. Use of the system can be an aid in conducting research assessments, avoiding duplication, and pinpointing areas of additional research need.

ERIS Scope

The term"energy-related" covers a broad spectrum of activities and encompasses a large volume of research. Nonetheless, ERIS attempts to report energy-related research projects in as comprehensive a manner as possible. This includes reclamation, energy conversion, and land use research, socioeconomic impact and alternate energy resource studies, as well as programs related to energy development which do not necessarily involve research. The geographic focus or ERIS is upon research conducted in the Old West Region states - Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

The compilation of energy research projects in the ERIS reports has been accomplished by combining ERIS's own information-gathering efforts with those of other clearinghouses - most notably, Oak Ridge National Laboratory's *Inventory of Energy R&D,* the Smithsonian Science Information Exchange, the Montana Energy Office, the North Dakota Regional Environmental Assessment Program (REAP) and the other various energy agencies of the states of the Old West Region.

Use of the Energy Research Information System (ERIS)

ERIS Projects Report

ERIS information is stored in a computerized data base. As the data base grows, periodic reports are printed which list the latest contents of the data base. The first such report was used in November, 1975.

Access to ERIS information is available through subject oriented sections and through the indexes located at the end of the listings. These indexes are: Location, Personal Name, Organization, Subject Keyword and Permuted Title. Instructions for the use of the indexes precede each section.

All ERIS listings are available from the ERIS staff or from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.

Computer Search Service

The holdings of ERIS are computerized, allowing for flexibility in conducting special searches of the data base. The computer search services is offered as a complement to the ERIS Project Listings. If your inquiry concerning energy research cannot be answered by manual use of the reports, contact a member of the ERIS staff and request that a special search be conducted.

ERIS is a part of the Research in Progress File (RIP) and the Energy R&D Projects File (ERD) of the U.S. Dept. of Energy's RECON Information Retrieval System. Designated RECON users may also access ERIS through their own terminals.

****

Please direct your inquiries to: ERIS,
Old West Regional Commission,
228 Hedden-Empire Bldg., Billings, MT 59101.
406/657-6665 (commercial) or 585-6665 (FTS).

The Old West Regional Commission is a Federal-State partnership designed to address regional economic problems and stimulate orderly economic growth in the states of Montana, Nebraska, North Dakota, South Dakota and Wyoming. Established in 1972 under the Public Works and Economic Development Act of 1965, it is one of eight such commissions in the United States.

The Land Reclamation Program at Argonne National Laboratory is conducting coordinated applied and basic research into the physical and ecological problems of land reclamation related to surface mining of coal and developing cost-effective techniques for reclaiming/rehabilitating mined coal land to productive end uses. The purpose of this program is to conduct integrated research and development projects focused on near- and long-term reclamation problems in all major U.S. coal resource regional including Alaska and to coordinate, evaluate, and disseminate the results of related studies conducted at other research institutions.

The function of the Water Resources Division of the Geological Survey is provide data and reports on the availability and quality of water required for conversion of coal and oil shale to other forms of energy, to monitor the effects of mining and related developments on regional water systems, and to conduct investigations and research in methods of measuring and predicting the effects of mining and associated operations on local and regional water resources.

ENERGY RESEARCH INFORMATION SYSTEM

COAL AND COAL PRODUCTS
PROCESSING

GASIFICATION

<1081>
PROJECT TITLE: Coal research, development and demonstration program (Environmental Impact Statement)
DURATION: 02/75-09/78
PRINCIPAL INVESTIGATOR(S): Pennington, Wm.
PHONE: C(301)353-4241;F353-4241
RESEARCH INSTITUTE: Energy Research and Development Administration, Washington, D.C.
SPONSOR: Energy Research and Development Administration, Washington, D.C.
LOCATION: CO;MT;DC
ABSTRACT: This Environmental Impact Statement is being prepared in order to analyze and assess the impacts of the growth of a commercial coal conversion and combustion industry based upon technology developed by the Coal Research, Development and Demonstration Program. The EIS will also assess the impacts associated with conjunctive developments such as mining and transportation of the coal needed to support the industry. In addition, the socioeconomic impacts associated with community development and/or expansion caused by the industry are assessed. The EIS also assesses alternatives within the program and alternatives to the program.
REPORTS AND PUBLICATIONS: Draft Environmental Impact Statement, Coal Research, Development and Demonstration Program, September 1977, Energy Research and Development Administration (a copy has been placed in the Regional Energy/Environmental Information Center, Denver Public Library, 1357 Broadway, Denver, CO).
RECORD NUMBER: OWRC-1146
RIP NUMBER: 008126

<1082>
PROJECT TITLE: Analytical and numerical modeling, transient analysis and hydrology studies of in situ coal gasification recovery processes
PROJECT NUMBER: 006 EY-77-C-04-3913
DURATION: 07/77-11/77
PRINCIPAL INVESTIGATOR(S): Gunn, R.D.; Hutchinson, R.
PHONE: C(307)766-3284;C(307)766-6357
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center
PROJECT MONITOR: Brandenbourg, C. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1977-$29,400
LOCATION: WY
ABSTRACT: The agreement comprises four separate projects: (1) Laboratory Simulation of In Situ Coal Gasification; (2) Stability Analysis of Reverse Combustion in Coal; (3) Transient Analysis in Underground Coal Gasification; and (4) Hydrology Studies for the Hanna III Test. The overall goals for the entire four projects and the specific objectives for this Task Agreement are as follows: (1) Determine the best operating conditions for field tests by means of inexpensive laboratory tests. Determine the parameters required for mathematical modeling of in situ coal gasification. (2) Determine stable conditions for the operation of both reverse and forward combustion during in situ coal gasification. (3) A. Use pulse air injection and/or production pressure buildup, drawdown, and interference tests during field trials to determine the volume and character of the region swept by the combustion zone. B. Develop mathematical methods for analyzing the data obtained. Develop mathematical methods to predict the rate of water influx into the combustion zone. (4) Use hydrological testing methods to characterize the coal seam and overlying aquifer in the Hanna III test area for permeability, porosity, and homogeneity.
RECORD NUMBER: OWRC-1094
RIP NUMBER: 007631

<1083>
PROJECT TITLE: Subcontract CONSOL CO_2 coal gasification pilot plant, Rapid City, South Dakota
DURATION: 01/76-06/77
PRINCIPAL INVESTIGATOR(S): Redden, J.A.; Fuerstenau, M.C.; Palmer, B.R.; Schmitz, B.; Jonte, R.; Lingard, A.L.; Carda, D.
PHONE: C(605)394-2496
RESEARCH INSTITUTE: South Dakota School of Mines and Technology, Rapid City
SPONSOR: Conoco Coal Development Co., Library, Pa.
PROJECT MONITOR: Sudbury, J. Conoco Coal Development Co., Library, PA 15129
FUNDING: 1976-$100,000
LOCATION: SD
ABSTRACT: Project includes research on carbonate rock resources, carbon dioxide acceptor reconstitution, corrosion rates in lime melts, trace elements in lignite, sulfur studies in lignite, carbonate grinding properties, and waste monitoring at the gasification plant at Rapid City, South Dakota. This project is a subcontract.
REPORTS AND PUBLICATIONS: (1) The Corrosion of Materials in Contact with $CaCO_3$--$Ca(OH)_2$ Melts, B.R. Palmer; (2) Determination of Liquidus Temperatures in the $CaCO_3$--$CaSO_4$--CaS and $CaCO_3$--$Ca(OH)_2$--CaO Systems, M.C. Fuerstenau; (3) Trace Elements in the Lignite CO_2 Gasification Process Pilot Runs, A.L. Lingard; (4) Study of Physical Characteristics of Carbonate Rocks to Determine Wear Properties and Crushing Properties, J.C. Mickelson.
RECORD NUMBER: OWRC-1208
RIP NUMBER: 009239

COAL AND COAL PRODUCTS
PROCESSING

LIQUEFACTION
(SEE ALSO 1081)

<1084>
PROJECT TITLE: Direct conversion of lignite to chemical feedstocks via a combination of molten salt catalysis and solvent refining technologies
PROJECT NUMBER: G and C 693
DURATION: 11/77-10/78
PRINCIPAL INVESTIGATOR(S): Scarrah, W.P.
PHONE: C(406)994-2221
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Chemical Engineering
SPONSOR: Department of Energy, Washington, D.C.
FUNDING: 1978-$19,900
LOCATION: MT
ABSTRACT: The objectives of this program are (1) to determine the potential for directly converting lignite to chemical feedstocks via a process combining technologies from molten salt catalysis and solvent refining, (2) to investigate the effects of alkali metal halides added to zinc chloride catalyst on product distribution and hydrocarbons-salt separation, (3) to determine the effects on product distribution of hydrogen sources as influenced by reducing gas composition, lignite moisture, and added water, and (4) to identify the significant processing variables (alkali metal halides and hydrogen sources) preparatory to more comprehensive process studies. A fractional experimental design will be used with the alkali metals lithium, sodium, and potassium to evaluate halides (chloride, bromide, iodide), reducing gases (hydrogen, carbon monoxide, syngas), and water sources (wet lignite, dry lignite, dry lignite plus added water). Batch runs using a rocking autoclave will be appropriate for undergraduate student operation due to their simplicity and shortness. Product analyses by gas chromatography and nuclear magnetic resonance will be made by experienced technicians. (MEO)
RECORD NUMBER: OWRC-1171
RIP NUMBER: 008718

<1085>
PROJECT TITLE: Engineering support: retorting of mixtures of coal and oil shale
PROJECT NUMBER: 003 EY-77-C-04-3913
DURATION: 10/76-08/78
PRINCIPAL INVESTIGATOR(S): Harris, G.; Hutchinson, H.L.
PHONE: C(307)766-3170;C(307)766-6357
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Dockter, L. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2351
FUNDING: 1976-$4,800; 1977-$53,800
LOCATION: WY
ABSTRACT: Unpublished work by researchers at the Laramie Energy Research Center

LIQUEFACTION
(CONTINUED)

<1085> CONT.
indicates that combined retorting of mixtures of coal and oil shale can result in improved quality and yield of the organic products evolved as compared with those obtained by processing coal and oil shale separately. The results of this preliminary work thus indicate that a more extensive laboratory scale experimental program is justified, and such a program is being undertaken by LERC workers. The specific objective which this work is to address is, What are the benefits and feasibility of combined coal and oil shale retorting in the presence of steam. The following services have been requested of the contractor by LERC: (1) to assist LERC in obtaining meaningful laboratory experimental data, (2) to interpret this laboratory scale data and establish statistically significant process variables, (3) to project these data to pilot scale, (4) to develop an effective pilot plant design for the co-retorting of coal and oil shale, and (5) to establish an experimental program for the pilot scale equipment.
RECORD NUMBER: OWRC-1091
RIP NUMBER: 007634

<1086>
PROJECT TITLE: Evaluation of liquids from shale oil and coal syncrudes for reclaiming deteriorated asphalt pavement
PROJECT NUMBER: 004 EY-77-C-04-3913
DURATION: 05/77-12/77
PRINCIPAL INVESTIGATOR(S): Lamb, D.R.; Wilson, E.M.; Hoyt, P.M.
PHONE: C(307)766-6220
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Plancher, H. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2122
FUNDING: 1977-$32,000
LOCATION: WY
ABSTRACT: In the past, asphalts have been generally considered a by-product of petroleum refining and there has been no real shortage of paving materials. However, that situation is changing and optimal use of asphalts has become a necessity. One fairly obvious approach to optimal use is simply to re-use the asphalts obtained from replaced roadways. The objective of this program is to determine if high-boiling liquids produced from coal liquefaction and oil shale retorting can be used in place of petroleum liquids as effective softening agents for recycling old or worn out asphalt paving materials. The characteristics of reclaimed asphalt materials and asphalt-aggregate mixtures will be investigated using standard engineering tests and specialized tests designed to examine specific properties. Results obtained on reclaimed asphalts will be compared with results on new asphalt, with standard specifications for new asphalts and with specification of the old asphalt at the time of its initial placement. Three main tasks are set forth: (1) Selection of recycling agents and characterization of reclaimed asphalts. (2) Characterization of recycled asphalt-aggregate mixtures. (3) Comparison of recycled asphalt and asphalt-aggregate mixtures with each other and with new asphalt and mixtures.
RECORD NUMBER: OWRC-1090
RIP NUMBER: 007635

(SEE ALSO 1200, 1207)

<1087>
PROJECT TITLE: Design of stable channels to remove surface runoff from graded mine spoils
DURATION: 10/77-06/79
PRINCIPAL INVESTIGATOR(S): Burroughs, E.; Hartsog, W.S.; Sundberg, E.
PHONE: C(406)994-4852
RESEARCH INSTITUTE: Forest Service, Bozeman, Mont.. Intermountain Forest and Range Experiment Station
SPONSOR: Environmental Protection Agency, Cincinnati, Ohio
PROJECT MONITOR: Hill, R. EPA, Cincinnati National Research Center, Cincinnati, OH
FUNDING: 1978-$47,000
LOCATION: MT;WY;ND
ABSTRACT: The general objective is to develop guidelines for the design and construction of stable drainage channels for removal of surface runoff from graded spoils. The main emphasis will be on designs for surface mines in the planning stage. Another objective will be to develop techniques for construction of stable drainage channels on eroded lands that were reclaimed prior to the Montana reclamation law.
RECORD NUMBER: OWRC-1207
RIP NUMBER: 009238

<1088>
PROJECT TITLE: Establishment, composition, and productivity of species adapted to areas disturbed by strip mining
PROJECT NUMBER: G and C 740
DURATION: 08/77-12/79
PRINCIPAL INVESTIGATOR(S): Burris, M.J.; Wilsner, L.
PHONE: C(406)994-3681
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Agricultural Experiment Station
SPONSOR: Montana State Univ., Bozeman. Agricultural Experiment Station; Cooperative State Research Service, Washington, D.C.
FUNDING: 1978-$22,500
LOCATION: MT
ABSTRACT: Objectives: (1) Evaluate the productivity and composition change of native species recently established on mine spoils; (2) Evaluate naturalized species to determine their establishment and productivity characteristics; (3) Continue to develop methods for overcoming seed dormancy of species which show promise for use in reclaiming mine spoils; (4) evaluate the build up of a dormant seed population on reclaimed areas in comparison to that present in undisturbed areas. Approaches: (1) Research plots established in 1976 will be evaluated to determine the change in species composition and forage production. These plots contain ten different native species. (2) Field plantings will be made on strip mined areas to determine the establishment, productivity, and adaptivity of introduced species; (3) Dormant seeds will be subjected to treatments such as scarification, presoaking, prechilling, and various chemicals and plant hormones; (4) Soil cores will be taken from 5-year-old stands established

COAL AND COAL PRODUCTS
WASTE MANAGEMENT

<1088> CONT.
on mine spoils and from undisturbed areas. Cores will be sectioned and the number of seeds in each section will be determined. If possible, seeds will be identified and their viability determined.
RECORD NUMBER: OWRC-1159
RIP NUMBER: 007959

<1089>
PROJECT TITLE: Microbial sulfur cycle activity in waters associated with a Montana coal strip mine
PROJECT NUMBER: G and C 574
DURATION: 09/77-08/78
PRINCIPAL INVESTIGATOR(S): McPeters, G.A.; Olson, G.
PHONE: C(406)994-2902
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Microbiology
SPONSOR: Office of Water Research and Technology, Washington, D.C.
FUNDING: 1978-$8,000
LOCATION: MT
ABSTRACT: This study will help describe how microorganisms that are active in the sulfur cycle participate in water quality transformations of mining impacted groundwaters and surface waters. We hope to determine: (1) why acidophilic thiobacilli, a causative agent of acid mine drainage, should be found in alkaline waters draining low sulfur coal beds at the Decker mine, (2) whether or not these organisms are forming acid from metal sulfides in the mine, (3) if the mine settling pond is acting as a basin for the removal of heavy metals from mine waters prior to their discharge from the mine as a result of the active sulfate reducing bacteria population, and (4) if sulfate reducing bacteria are responsible for the presence of hydrogen sulfide in the groundwaters near the mine, and has mining played a role in the process. Answers to these questions would help us to predict the effects future mining would have on the water quality of mine impacted areas in Montana.
RECORD NUMBER: OWRC-1174
RIP NUMBER: 007968

COAL AND COAL PRODUCTS
ENVIRONMENTAL ASPECTS
(SEE ALSO 1082, 1087, 1088, 1089, 1124, 1200, 1206, 1207, 1210, 1213, 1221, 1222)

<1090>
PROJECT TITLE: Health implications of coal related energy development: mining impacts
DURATION: 11/77-01/80
PRINCIPAL INVESTIGATOR(S): Bell, M.A.; Savitz, D.; Warling, J.C.
PHONE: C(614)424-7577
RESEARCH INSTITUTE: Battelle Columbus Labs., Ohio
SPONSOR: Environmental Protection Agency, Cincinnati, Ohio. Health Effects Research Lab.; Battelle Columbus Labs., Ohio
FUNDING: 1978-$36,100
LOCATION: ND;SD;MT;WY;CO;UT
ABSTRACT: This project will examine the potential adverse health effects associated with increased coal production in the western United States. Currently 154 new coal mines or expansions of existing mines are planned, proposed, or under development in this area. During the study, researchers initially will characterize the current health status of populations residing in the vicinity of western coal mining centers. Sites will be selected based on potential for future coal expansion, availability of health and environmental data, population size, and cooperation from local officials. Available environmental monitoring data, particularly water quality data from each of the sites, will receive detailed investigation. Relevant data on community sanitation services such as water supply, sewage disposal, solid waste disposal, and food sanitation will also be examined. Community health services and local morbidity and mortality patterns will be characterized. The information generated in the study will provide baseline data representing both health status and environmental quality against which future changes associated with increased coal production can be assessed. The study will also serve as a model for securing health status and environmental information needed for future research of mining impacts in these populations.
RECORD NUMBER: OWRC-1198
RIP NUMBER: 008735

<1091>
PROJECT TITLE: Surface mining effects and stipulations manuals
PROJECT NUMBER: WELUT No. 010-76
DURATION: 01/77-10/77
PRINCIPAL INVESTIGATOR(S): Moore, R.
RESEARCH INSTITUTE: Ecology Consultants, Inc., Fort Collins, Colo. ; Bittman Associates, Inc., Columbia, Md.. Environmental and Geosciences Dept.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Ishinger, L. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, P323-5287
FUNDING: 1977-$150,000
LOCATION: MT;ND;CO;UT;NM;WY
ABSTRACT: This project will summarize surface mining technology and activities and the related physical, chemical, and biological impacts in the western

<1091> CONT.
United States. A handbook for each of three western geomorphic regions (Northern Great Plains, Rocky Mountain and Arid Southwest) will be prepared summarizing surface mining impacts, recommended environmental stipulations, and a flow diagram indicating when and where control stipulations can be introduced to benefit fish and wildlife.
REPORTS AND PUBLICATIONS: (1) B. Moore, An Environmental Guide to Western Surface Mining, Part One: Federal Leasable and Locatable Mineral Regulations, Ecology Consultants, Inc., Fort Collins, CO, Jun 1977, 67 pp. (FWS/OBS-77/20), L.C. No. 77-82534, NTIS Accn. No. PB 272 153 (PC:A05/MF:A01); (2) Three separately bound manuals which discuss fish and wildlife problems associated with surface mining in: (a) The Intermountain Region, (b) The Great Plains Region, and (c) The Southwest Region, contact Lee Ischinger, Project Officer, U.S. Fish and Wildlife Service, WELUT, Federal Building, Fort Collins, CO 80521, for availability.
RECORD NUMBER: OWRC-1101
RIP NUMBER: 007650

<1092>
PROJECT TITLE: Investigation of possible techniques to predict groundwater quality in mined lands
PROJECT NUMBER: No. 579
DURATION: 10/77-09/78
PRINCIPAL INVESTIGATOR(S): Hedges, R.; Van Voast, W.A.; Nicklin, M.
PHONE: C(406)657-2251
RESEARCH INSTITUTE: Montana Bureau of Mines and Geology, Billings
SPONSOR: Office of Water Research and Technology, Washington, D.C.
FUNDING: 1978-$8,500
LOCATION: MT
ABSTRACT: Objectives of this project are to examine and experiment with earth-resistivity and saturated-paste data, to compare the results with existing mined-area water-quality data, and to conclude whether these or some other techniques may be usable in predicting post-mining water quality. If possible in the scope of the project, progress will be made in actual development of the predictive capability. (MEO)
RECORD NUMBER: OWRC-1177
RIP NUMBER: 007971

<1093>
PROJECT TITLE: Environmental Impact Statement--Spring Creek Coal Company's proposed coal mine
DURATION: 05/76-06/78
PRINCIPAL INVESTIGATOR(S): Howard, C.
PHONE: C(406)449-2074
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena
COOPERATOR: U.S. Geological Survey, U.S. Bureau of Land Management, Northern Powder River EIS Team
SPONSOR: NERCO, Inc., Helena, Mont.
FUNDING: 1976-$30,000; 1977-$35,000

<1093> CONT.
LOCATION: MT;WY
ABSTRACT: Spring Creek Coal Co. proposes to open a new coal strip mine in Big Horn County, Montana in the area of T8S/R39E and 40E/Sections 22, 23, 25, 26, 27. This mine would produce coal at a rate of 10 million tons per year at full production. The Montana Department of State Lands and the U.S. Geological Survey have determined that an EIS is necessary. These agencies are presently engaged in the process of preparing such an EIS on a joint basis.
REPORTS AND PUBLICATIONS: (1) Spring Creek Coal Co. Permit Application, Vols. 1-6; (2) Spring Creek Coal Co. Environmental Baseline, Vols. 1-2. These publications can be obtained through the Mt. Dept. of State Lands.
RECORD NUMBER: OWRC-1156
RIP NUMBER: 008114

<1094>
PROJECT TITLE: Environmental Impact Statement--proposed MONTCO coal strip mine
DURATION: 04/77-04/80
PRINCIPAL INVESTIGATOR(S): Janis, D.
PHONE: C(406)449-2074
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena
SPONSOR: MONTCO, Billings, Mont.
LOCATION: MT
ABSTRACT: MONTCO proposes to open a new coal strip mine somewhere along the east side of the Tongue River across from the No. Cheyenne Indian Reservation. The exact location of the new mine is unknown at this time, and is partly dependent on a proposed railroad spur.
RECORD NUMBER: OWRC-1155
RIP NUMBER: 008113

<1095>
PROJECT TITLE: Decker Mine proposals: a demographic analysis
DURATION: 07/75-03/76
PRINCIPAL INVESTIGATOR(S): Fitzpatrick, J.
RESEARCH INSTITUTE: Montana Office of Budget and Program Planning, Helena
SPONSOR: Montana Dept. of State Lands, Helena
FUNDING: 1976-$8,000
LOCATION: MT;WY
ABSTRACT: To outline a maximum boundary for the demographic impact analysis of the proposed Decker Mines consistent with the boundaries chosen for the remainder of the social and economic impacts analysis, a three county area was selected: Rosebud and Big Horn Counties in Montana, and Sheridan County, Wyoming. Since 1960 the level of population within the impact area has remained relatively static, although a population increase apparently stimulated by local coal development is evident in the 1970-1974 Census Bureau reports. The three county region now contains six operating strip mines. Twelve major assumptions concurring with development of the proposed Decker Mines are used as the basis for estimating population change in the area impacted. Based on these assumptions, a population peak is indicated

<1095> CONT.
in 1980 with an increase of 1,902 persons. The proposed East Decker operation is projected to be responsible for approximately 80% of the Decker-related population growth. Sheridan County is projected to receive 90% of the mine's population impact. Big Horn County is projected to receive 10%, while Rosebud County is not expected to experience a measurable amount of population changes as a result of the Decker proposals.
RECORD NUMBER: OWRC-1188
RIP NUMBER: 008725

<1096>
PROJECT TITLE: Western coal energy development impact planning reference system: impact evaluation guide
PROJECT NUMBER: W89
DURATION: 05/78-09/78
PRINCIPAL INVESTIGATOR(S): Chalmers, J.A.; York, M.
PHONE: C(602) 968-7991
RESEARCH INSTITUTE: Mountain West Research, Inc., Tempe, Ariz.
COOPERATOR: Environmental Research and Technology, Inc.
SPONSOR: Western Coal Planning Assistance Project, Billings, MT
PROJECT MONITOR: Greenberg, A. Western Coal Planning Assistance Project, 208 North 29th Street, Suite 212, Billings, MT 59101
FUNDING: 1978-$28,000
LOCATION: ND;MT;WY
ABSTRACT: The objective is to enable local governments to place the factual information regarding coal development into an analytic framework which will provide the required specific inputs to their policy and program decisions. The project describes elements of useful analytic frameworks and their role in assisting local governments to more adequately fulfill their responsibilities concerning coal/energy development impact. Techniques discussed address questions such as long term capital facility planning, facility impact analysis, social and environmental impact mitigation. This project is part of WCPAP Planning Reference System.
REPORTS AND PUBLICATIONS: Impact Evaluation Guide, to be published by WCPAP under the auspices of the Missouri River Basin Commission and the Resource Assessment and Land Investigation Program of USGS, available from Project Manager, Western Coal Planning Assistance Project, 208 N. 29th Street, Suite 212, Billings, MT 59101, at no cost.
RECORD NUMBER: OWRC-1213
RIP NUMBER: 009244

<1097>
PROJECT TITLE: Western coal energy development impact planning reference system: factbook
PROJECT NUMBER: W88
DURATION: 05/78-09/78
PRINCIPAL INVESTIGATOR(S): Jelinek, D.; York, M.; Freudenthal, D.
PHONE: C(406)259-8982
RESEARCH INSTITUTE: Mountain West Research, Inc., Billings, Mont.
COOPERATOR: Intrasearch, Inc.; Environmental Research and Technology, Inc.
SPONSOR: Western Coal Planning Assistance Project, Billings, MT
PROJECT MONITOR: Greenberg, A. Western Coal Planning Assistance Project, 208 North 29th Street, Billings, MT 59101
FUNDING: 1978-$50,000
LOCATION: MT;WY;ND
ABSTRACT: The objective is to provide a single reference source of up-to-date, comprehensible information about the location, quality, and quantity of coal resources in the WCPAP region as well as the technologies and impacts of extraction, conversion and transportation. Contents of the reference include location, quality and quantity of coal resources; description of technologies being used or likely to be used to extract, convert and transport the coal; description of coal, water, capital, labor and land requirements of each technology together with the major socioeconomic and environmental effects associated with it; and description of major public sector regulatory framework affecting each technology, with emphasis on points in the process at which local governments can intervene to ensure the representation of their constituents' rights. This project is part of WCPAP Planning Reference System.
REPORTS AND PUBLICATIONS: Factbook to be published by WCPAP under the auspices of the Missouri River Basin Commission and Resource Assessment and Land Investigation Program of USGS, available from Project Manager, Western Coal Planning Assistance Project, 208 North 29th Street, Suite 212, Billings, MT 59101, at no cost.
RECORD NUMBER: OWRC-1214
RIP NUMBER: 009245

<1098>
PROJECT TITLE: Environmental impact assessment
PROJECT NUMBER: 005 EY-77-C-04-3913
DURATION: 05/77-10/77
PRINCIPAL INVESTIGATOR(S): Skinner, Q.; Auer, A. R.; Rogers, D. C.; Hasfurther, V.; Smith, V.E.; Foster, D.H.; Weand, B.L.; Wichers, W.F.; Ogle, P.R.; Thompson, J.G.
PHONE: C(307) 766-2143
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Winter, J. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307) 721-2208
FUNDING: 1977-$84,100

<1098> CONT.
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center conducts process and environmental research on in situ technologies in the field. Field studies provide the opportunity to conduct research that will help predict environmental impacts which might occur as a result of commercialization. Compliance with the National Environmental Policy Act (NEPA) and DOE regulations requires the following studies related to LERC research: (1) potential impacts from conducting a field experiment must be identified so that they can be mitigated to the greatest extent practicable, and (2) potential environmental impacts of full scale commercial projects must be identified and researched prior to reaching commercialization. This proposal requests the Rocky Mountain Institute of Energy and Environment to assist LERC in the preparation of Environmental Impact Assessment Reports, as required by NEPA and DOE regulation 10 CFR 711. Assistance will be required in obtaining data and preparing a report predicting the environmental implications for three different LERC activities: (a) conducting an oil shale in situ research program in the Laramie and Rock Springs, Wyoming, areas, (b) conducting an underground coal gasification research program near Hanna, Wyoming, and (c) conducting in situ recovery research on tar sands near Vernal, Utah.
RECORD NUMBER: OWRC-1098
RIP NUMBER: 007640

<1099>
PROJECT TITLE: Scenarios for utilizing process and mine waters for aquatic habitat enhancement
PROJECT NUMBER: WELUT No. 028.1-77
DURATION: 05/77-02/78
PRINCIPAL INVESTIGATOR(S): Hutchins, J.C.;
RESEARCH INSTITUTE: Skelly and Loy, Harrisburg, Pa.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Isbinger, L. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, F323-5287
FUNDING: 1977-$87,900
LOCATION: MT;ND;WY;CO;UT;NM
ABSTRACT: This project will develop a state-of-the-art manual detailing existing and promising methods and strategies related to the utilization of western coal-mine and mine-mouth conversion plant waste waters for fish and wildlife habitat enhancement.
REPORTS AND PUBLICATIONS: (1) A state-of-the-art manual including (A) an annotated bibliography describing existing technology and practices regarding the utilization of process and mine waters for habitat development or enhancement, (B) scenarios representative of surface and underground mining, coal-fired steam-electric generating stations, and coal gasification. The scenarios will include the construction of composite mass

<1099> CONT.
water balances for each waste water source, (C) habitat development/enhancement scenarios, (D) practical and innovative waste-water strategies for each scenario.
RECORD NUMBER: OWRC-1100
RIP NUMBER: 007651

COAL AND COAL PRODUCTS
MINING
(SEE ALSO 1090, 1093, 1094, 1095, 1096, 1097, 1107, 1108, 1110, 1111, 1216)

<1100>
PROJECT TITLE: Coal board impact identification project
DURATION: 04/78-12/78
PRINCIPAL INVESTIGATOR(S): Brunner, B.; Awner, A.
PHONE: C(406)449-2470
RESEARCH INSTITUTE: Montana Dept. of Community Affairs, Helena
COOPERATOR: Montana Dept. of State Lands
SPONSOR: Montana Dept. of Community Affairs, Helena
FUNDING: 1978-$80,000
LOCATION: MT
ABSTRACT: The purpose of this project is to develop an outline of objective, but flexible, criteria and processes for use by the Montana Coal Board in: (1) identifying and evaluating the primary and secondary impacts of coal development in Montana communities; (2) determining what kinds of financial, informational or technical assistance would facilitate local planning and growth management efforts for dealing with the impacts of coal development; and (3) developing recommendations or programs which may enhance the ability of the Coal Board to formulate its priorities and make timely, foresighted and equitable decisions, geared especially to serve those needs of impact communities which are not adequately addressed elsewhere. The project should result in the identification of methods, acceptable to the Coal Board, by which local communities can reasonably identify and verify impact and their consequent community needs. Background information will be developed to help define the financial issues of importance in coal impact areas. The project may include recommendations to the Coal Tax Oversight Committee concerning legislation which might improve the ability of the Board to assist impacted communities. Local government officials, planning boards, and citizens will be consulted and involved throughout the project. The project will utilize information and studies which have already been developed, where these appear reasonably reliable, appropriate, and applicable to Montana. The results of this project will be presented in a manner usable by the Coal Board and by Montana communities which are or may be experiencing impact.
RECORD NUMBER: OWRC-1180
RIP NUMBER: 007954

<1101>
PROJECT TITLE: Environmental impact statement--Peabody Coal Company's Big Sky Mine extension
DURATION: 12/77-indefinite
PRINCIPAL INVESTIGATOR(S): Janis, D.
PHONE: C(406)449-2074
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena
SPONSOR: Peabody Coal Co., St. Louis, Mo.
LOCATION: MT

<1101> CONT.
ABSTRACT: Peabody Coal Company is proposing to extend its present coal strip mine (Section 22) into T1N, R41E, Sections 13, 14, 15, 23, and 24. This action requires the preparaton of an EIS.
RECORD NUMBER: OWRC-1165
RIP NUMBER: 007963

<1102>
PROJECT TITLE: Environmental impact statement--Westmoreland Absaloka Coal Mine expansion into section 36
DURATION: 06/76-12/77
PRINCIPAL INVESTIGATOR(S): Janis, D.; Woods, M.
PHONE: C(406)449-2074
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena
SPONSOR: Westmoreland Resources, Helena, Mont.
LOCATION: MT
ABSTRACT: Westmoreland Resources is requesting a permit to expand coal strip mining operations into Section 36, T1N, R37E. This has required an EIS to be written.
REPORTS AND PUBLICATIONS: (1) Draft EIS, issued June 24, 1977; (2) Final EIS, issued December, 1977.
RECORD NUMBER: OWRC-1164
RIP NUMBER: 007962

<1103>
PROJECT TITLE: Environmental impact statement--Shell's proposed Pearl Coal Mine
DURATION: 07/77-07/78
PRINCIPAL INVESTIGATOR(S): Johnson, S.
PHONE: C(406)449-2074
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena
COOPERATOR: U.S. Geological Survey, Montana Dept. of Health and Environmental Sciences, U.S. Bureau of Land Management, Northern Power River EIS Team
SPONSOR: Shell Oil Co., Houston, Tex., Mining Ventures Dept.
FUNDING: 1978-$60,000
LOCATION: MT;WY
ABSTRACT: Shell Oil Company proposes to open a truck and shovel operation, mining about 2 million tons of coal per year and shipping about 4.4 unit trains/week. The areas affected will be T9S/R39E/Section 36, T9S/R39E/Section 32, 33, T10S/R38E/Section 1.
RECORD NUMBER: OWRC-1170
RIP NUMBER: 007957

COAL AND COAL PRODUCTS
    MINING

<1104>
PROJECT TITLE: Design and evaluation of improved surface coal mine overburden handling and coal extraction techniques
PROJECT NUMBER: J0255023
DURATION: 07/75-06/76
PRINCIPAL INVESTIGATOR(S): Bowersmith, J.A.
PHONE: C(213) 481-7371
RESEARCH INSTITUTE: Theodore Barry and Associates, Los Angeles, CA
SPONSOR: Bureau of Mines, Spokane, Wash.. Spokane Mining Research Center
FUNDING: 1976-$148,000
LOCATION: MT;WY;ND;CO;UT;NM;IL;WV;PA;OR
ABSTRACT: Four innovative surface mining methods are developed which promise high quality reclamation while maintaining production of low-cost coal. The terrace-pit system excavates overburden with mobile equipment and transports and deposits the spoils with either scrapers or trucks. The pit is bowl shaped and terraced at both ends. Rehandling is not required because spoil placement is easily controlled, and reclamation grading can be concurrent with production. The area haulback system excavates overburden with a dragline, deposits the spoil on the highwall, then hauls it back into the pit with trucks. This system can substantially increase coal production in deep pits, is competitive with draglines when spoil rehandling reaches 50%, and provides for selective spoil placement. In periphery mining, the dragline excavates overburden along a curved pit which first circumscribes an area and continues in a spiral fashion to mine toward the center of the property. This results in reduced handling, concurrent reclamation, the elimination of spoil haulage roads, and an averaged stripping ratio. The twin tower excavator system excavates unconsolidated overburden with a bucket dragged by cables running between two towers stationed on each side of the pit. The towers leave no spoil ridges typical of dragline operations. Operating costs are about the same as dozers and front-end loaders.
REPORTS AND PUBLICATIONS: John A. Bowersmith, et al., Design and Evaluation of Improved Surface Coal Mine Overburden Handling and Coal Extraction Techniques, June 1976, U.S. Bureau of Mines, NTIS No. PB-264-768/AS, $6.75..
RECORD NUMBER: OWRC-1185
PIP NUMBER: 008722

COAL AND COAL PRODUCTS
    TRANSPORT AND HANDLING
    (SEE ALSO 1195)

<1105>
PROJECT TITLE: Comparative coal transportation costs: an economic and engineering analysis of truck, belt, rail, barge, and coal slurry and pneumatic pipelines
PROJECT NUMBER: DOI No. J0166163
DURATION: 01/76-08/77
PRINCIPAL INVESTIGATOR(S): Rieber, M.; Soo, S.L.
RESEARCH INSTITUTE: Illinois Univ., Urbana. Center for Advanced Computation
SPONSOR: Bureau of Mines, Washington, D.C.
LOCATION: MT;ND;WY
ABSTRACT: This study consisted of: (1) costing of coal carrying unit trains based on a facility and system description of the operation including necessary upgrading; (2) coal slurry pipelines were described and costed, environmental impacts studied, and pipeline flexibility analyzed; (3) coal transportation by dedicated-integrated tows was studied and costed for the major inland waterways; (4) costing of coal transport by conveyor-belt, for a range of tonnages and distances, based on an heuristic model of an optimal system for each case, was analyzed; (5) an heuristic facility and costing model was developed for over the road coal transport at varying distances and tonnages; (6) based on past and current studies, a theoretical analysis of a coal carrying pneumatic pipeline was presented including friction factors, minimum transport velocity and pipeline telescoping; and (7) the use of overage rail cars and locomotives as a gathering system for groups of small coal mines in the vicinity of existing lightly used or railbanked track was studied and costed.
REPORTS AND PUBLICATIONS: Michael Rieber and Shao Lee Soo, August 1977, Comparative Coal Transportation Costs: An Economic and Engineering Analysis of Truck, Belt, Rail, Barge, and Coal Slurry and Pneumatic Pipelines: Volume I--Summary and Conclusions; Volume II--Unit Trains; Volume III--Coal; Volume IV--Barge Transport; Volume V--Conveyor Belts; Volume VI--Truck Haulage; Volume VII--Pneumatic; Volume VIII--Yellow Ball Rail.
RECORD NUMBER: OWRC-1223
PIP NUMBER: 008877

COAL AND COAL PRODUCTS
COMBUSTION

<1106>
PROJECT TITLE: Surface analytical studies of micron and sub-micron fly ash from coal-fired MHD
PROJECT NUMBER: G and C 320
DURATION: 08/77-09/78
PRINCIPAL INVESTIGATOR(S): Gobby, R.L.
PHONE: C(406) 994-3614
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Physics
SPONSOR: Montana Energy and MHD Research and Development Inst., Inc., Butte
LOCATION: MT
ABSTRACT: Coal-fired power plants are known to emit fly ash particles from hundreds of microns to less than one micron in size. Studies have indicated that the smaller particles have a greater concentration of trace elements (both toxic and non-toxic), and that the majority of these trace elements occur at the surface of the particles. Coal-fired MHD power plants may complicate the situation even further. Preliminary studies indicate that, due to the higher combustion temperatures and the quenching of exhaust gases, a much larger fraction of the particulate fly ash is in the sub-micron range. The potential problems here are significant. First the sub-micron fly ash will be much more difficult to contain or filter out than particles on the order of 100 microns. Second the previous studies would imply that trace element concentrations would be even higher. It is the objective of this proposal to use relatively new, state of the art, surface analytical techniques to determine the chemical and physical micro-structure of these sub-micron particles. If the kinetics of formation of these particles can indeed be understood, the information could be vital to design engineers wishing to avoid and/or contain the sub-micron particulate matter resulting from a coal-fired MHD plant. This project is a subcontract.
RECORD NUMBER: OWRC-1175
RIP NUMBER: 007969

COAL AND COAL PRODUCTS
MARKETING AND ECONOMICS

<1107>
PROJECT TITLE: Taxation of surface and underground coal mining in western state
DURATION: 06/75-08/76
PRINCIPAL INVESTIGATOR(S): Bronder, L.D.
PHONE: C(303)837-5851
RESEARCH INSTITUTE: Western Governors Regional Energy Policy Office, Denver, Colo.
SPONSOR: Old West Regional Commission, Washington, D.C. ; Four Corners Regional Commission
LOCATION: MT;NM;ND;UT;WY;AZ;CO
ABSTRACT: This study sets forth the taxes on coal mining in seven western states. Two hypothetical mines, surface and underground, from U.S. Bureau of Mines studies are, in a sense, placed on a magic carpet and located in each state. The property, income, franchise, severance, and gross receipts taxes are calculated as if the mine were in operation in each state. Tax comparisons from state to state are presented to compare both total taxes and specific taxes between states. Total taxes are shown on a per ton basis to assist in evaluating the productivity of these tax systems. These data are predicated in a model mine in each state; actual taxes per mine would vary insofar as the model mine is different from a typical mine in a state.
REPORTS AND PUBLICATIONS: Taxation of Surface and Underground Coal Mining in Western States, August 1976, prepared by Leonard D. Bronder, Resource Economist, Western Governors' Regional Energy Policy Office (inquire at Western Interstate Energy Board, 2500 Stapleton Plaza, 3333 Quebec, Denver, CO 80207 for availability).
RECORD NUMBER: OWRC-1100
RIP NUMBER: 008120

<1108>
PROJECT TITLE: Taxation of coal mining
DURATION: 06/75-01/76
PRINCIPAL INVESTIGATOR(S): Bronder, L.D.
PHONE: C(303)837-5851
RESEARCH INSTITUTE: Western Governors Regional Energy Policy Office, Denver, Colo.
SPONSOR: Old West Regional Commission, Washington, D.C. ; Four Corners Regional Commission
LOCATION: MT;WY;ND;SD;NE;NV;AZ;NM;CO;UT
ABSTRACT: This study explored the avenues of coal mining taxation in the ten states of the Western Governors' Regional Energy Policy Office, which may be followed to tax coal in an equitable manner. Alternative means of taxation were examined in light of growing community needs. The following topics were covered in the course of this study: Legal Issues and Severance Taxes; The Tax Burden; Suitable Tax Rates; What Base Is Appropriate. With respect to property taxation, these issues were explored: Capitalization Methods to Determine Valuation; Having Difficulty in Using Royalty Base; Gross Proceeds as a Basis of Valuation; and Taxation of Mining Equipment.
REPORTS AND PUBLICATIONS: Taxation of Coal Mining: Review with Recommendations,

<1108> CONT.
January 1976, prepared by Leonard D. Bronder for the Western Governors' Regional Energy Policy Office (inquire at Western Interstate Energy Board, 2500 Stapleton Plaza, 3333 Quebec, Denver, CO 80207 for availability).
RECORD NUMBER: OWRC-1101
RIP NUMBER: 008121

<1109>
PROJECT TITLE: National Coal Policy Project
DURATION: 01/77-03/78
PRINCIPAL INVESTIGATOR(S): Murray, F.X.
PHONE: C(202)833-1930
RESEARCH INSTITUTE: Georgetown Univ., Washington, D.C.. Center for Strategic and International Studies
SPONSOR: Sponsors Unspecified
FUNDING: 1977-$339,500; 1978-$339,500
LOCATION: DC
ABSTRACT: This project was designed to bring together leading individuals from environmental and industry groups to seek consensus on the important national policy issues related to the use of coal in an environmentally and economically acceptable manner. Five task forces and an ad hoc task force were established with each responsible for a different area of interest: mining, transportation, air pollution, conservation and fuel utilization, energy pricing, and emission charges. Each task force prepared a report. The summary volume describes the purpose, scope and background of the project, provides a synthesis of the principles which underlie the project recommendations, and summarizes each task force report. Volume I contains the full reports of the Transportation, Air Pollution, Fuel Utilization and Conservation, Energy Pricing and Ad Hoc Emission Charge Task Forces. The Transportation Task Force examined the federal regulations governing the hauling of coal and recommended comprehensive reform of the regulations of all transportation modes. The Air Pollution Task Force focused its attention on several major issues and made recommendations which suggest the need for changes in current laws at both the state and federal level. The Fuel Utilization and Conservation Task Force considered (1) measures for encouraging the development of new technologies, (2) institutional obstacles to conservation, and (3) coal conversion mandates. The Energy Pricing Task Force examined the role prices play in the efficient allocation of resources, the steam coal market, and the pricing of electricity. The Ad Hoc Emission Charge Task Force developed a proposal as an alternative to individual source emission limitations in State Implementation Plans. Volume II contains the Mining Task Force Report which assesses the social, economic, and environmental aspects of coal mining.
REPORTS AND PUBLICATIONS: Where We Agree: Report of the National Coal Policy Project, Francis X. Murray (Ed.), May 1978. The Summary, Volumes I and II can be obtained from Westview Press, 5500 Central Avenue, Boulder, CO 80301, for $37.50. The Summary may be obtained alone for $2.95 from CSIS, Suite 520, 1800 K Street, N.W., Washington, D.C. 20006.
RECORD NUMBER: OWRC-1150
RIP NUMBER: 008109

<1110>
PROJECT TITLE: Western coal energy development impact planning reference system: sourcebook
PROJECT NUMBER: W90
DURATION: 05/78-09/78
PRINCIPAL INVESTIGATOR(S): Moore, J.; Branch, K.; Jelinek, J.; York, M.; Schmitt, J.; Staples, C.
PHONE: C(406)259-8982
RESEARCH INSTITUTE: Mountain West Research, Inc., Billings, Mont.
SPONSOR: Western Coal Planning Assistance Project, Billings, MT
PROJECT MONITOR: Greenberg, A. Western Coal Planning Assistance Project, 208 North 29th Street, Billings, MT 59101
FUNDING: 1978-$27,000
LOCATION: ND;MT;WY
ABSTRACT: The objective is to provide annotated list of data/information sources appropriate to reference requirements of local planners and decision-makers dealing with coal/energy development impact problems; include instructions for use of these materials. Contents of the reference include annotated list of key published and unpublished documents available to planners; relevant and accessible bibliographic retrieval systems; relevant and accessible data files and information systems; relevant maps, aerial photos and satellite imagery; sources of technical assistance; and sources of financial assistance (funding). Subjects covered are socioeconomic impact, environmental impact, coal resources, capital facilities and public services. This project is part of WCPAP Planning Reference System.
REPORTS AND PUBLICATIONS: Sourcebook to be published by WCPAP under the auspices of the Missouri River Basin Commission and Resource Assessment and Land Investigation Program of USGS, available from Project Manager, Western Coal Planning Assistance Project, 208 North 29th Street, Suite 212, Billings, MT 59101, at no cost.
RECORD NUMBER: OWRC-1215
RIP NUMBER: 009246

<1111>
PROJECT TITLE: Legal study of the extent of state control over reclamation on federal land
DURATION: 06/75-01/76
PRINCIPAL INVESTIGATOR(S): Barry, H.J.
PHONE: C(303)837-5851
RESEARCH INSTITUTE: Western Governors Regional Energy Policy Office, Denver, Colo.
SPONSOR: Old West Regional Commission, Washington, D.C. : Four Corners Regional Commission
LOCATION: MT;WY;ND;SD;NE;NV;AZ;NM;CO;UT
ABSTRACT: The recent resurgence of states rights advocacy has brought a number of federal-state jurisdictional questions to the fore, particularly in the energy development area. A major concern in the west is the extent of state authority over federal coal land subject to strip mining. This study analyzes the current law on the subject, including legislative and executive agency action. Analysis of this issue under constitutional principles discloses the following: (1) Congress could, under its enumerated powers, enact a law which would pre-empt all state authority over reclamation on federal land. (2) Thus far, no such legislation is extant. The Mineral Leasing Act (and related provisions) does not pre-empt state law. (3) The Dept. of Interior is constitutionally incapable of pre-empting state law by regulation, unless clearly authorized by Congress to do so. We find no such authority. (4) Congress has nearly complete authority over Article I federal land--land such as Washington, D.C., air bases, post offices, etc. (5) Congress has less authority over Article IV public land (Public Domain) and federal rights on such land are similar to those of any proprietor, and are subject to state law. If acting as a proprietor, rather than a sovereign, federal legislative acts cannot invoke the supremacy clause. (6) Both federal and state officials fail to recognize the above principles, with the result that federal power has been abnormally extended, without significant state opposition. From a constitutional point of view, states need not surrender all authority on federal land.
REPORTS AND PUBLICATIONS: Legal Study: Extent of State Control Over Reclamation on Federal Land, prepared by Hamlet J. Barry for the Western Governors' Regional Energy Policy Office, March 1976 (inquire at Western Interstate Energy Board, 2500 Stapleton Plaza, 3333 Quebec, Denver, CO 80207 for availability).
RECORD NUMBER: OWRC-1142
RIP NUMBER: 008122

PETROLEUM
PROCESSING

<1112>
PROJECT TITLE: Northern Tier crude oil study
DURATION: 05/76-07/76
PRINCIPAL INVESTIGATOR(S): Nybo, J.R.
PHONE: C(406)449-3900
RESEARCH INSTITUTE: Montana Energy Advisory Council, Helena
SPONSOR: Federal Energy Administration, Washington, D.C. ; Montana Energy Advisory Council, Helena
FUNDING: 1976-$15,000
LOCATION: MT
ABSTRACT: This project involved the documentation of the historical and current refinery and pipeline situation in Montana, including both an examination of data and direct involvement with the refinery and pipeline industry. The study included the following components: (1) a refinery and pipeline survey; (2) a study of alternatives which show promise toward full or partial solution of the feedstock supply problem; (3) a study of synthetic liquids from coal; (4) a study of natural gas/condensate from Montana formations; and (5) a study of the economic impacts of refinery shutdown and pipeline construction.
REPORTS AND PUBLICATIONS: (1) Montana Petroleum Situation, MEAC Staff Paper 76-1, May 1976, revised September 1976; (2) Paul E. Polzin, Economic Importance of Montana's Refineries and Projected Impacts of Curtailments in Canadian Petroleum Imports, a Report to MEAC, July 1976; (3) Maher Ibrahim, Undiscovered Natural Gas Resources of Montana, a Report to MEAC, July 1976; (4) John R. McBride, Coal Liquefaction: Technology, Impacts, and Technical Suitability for Montana, a Report to MEAC, September 1976 (all available from MEAC).
RECORD NUMBER: OWRC-1195
RIP NUMBER: 008732

PETROLEUM
ENVIRONMENTAL ASPECTS
(SEE ALSO 1220)

<1113>
PROJECT TITLE: Northern tier pipeline system
DURATION: 11/77-09/79
PRINCIPAL INVESTIGATOR(S): Leonard, A.[illegible]; Ramerski, F.
PHONE: C(503)234-3361 ext.4177
RESEARCH INSTITUTE: Bureau of Land Management, Portlant, Oreg.
SPONSOR: Northern Tier Pipeline Co., Helena, Mont.
FUNDING: 1978-$2,500,000
LOCATION: WA;ID;MT;ND;MN
ABSTRACT: This Environmental Impact Statement will address the proposed action of the Northern Tier Pipeline Company to construct a pipeline system to deliver Alaskan and foreign crude oil from Port Angeles, Washington, 1550 miles to Clearbrook, Minnesota, to serve existing refineries en route and connecting pipeline systems. The pipeline would cross three other states between Washington and Minnesota: Idaho, Montana and North Dakota. Tanker unloading, transfer, storage and support facilities would be constructed at, or in the vicinity of, Port Angeles. The pipeline would consist of 42-inch and 40-inch diameter pipe, in combination, with a capacity of 933,000 barrels per day to Clearbrook. The EIS will address the impact on all resources, and on the human and natural environments, of construction of all facilities necessary for implementation of the proposal.
RECORD NUMBER: OWRC-1151
RIP NUMBER: 008110

<1114>
PROJECT TITLE: Northern Tier Pipeline Project (Environmental Impact Statement--State)
DURATION: 02/78-06/80
PRINCIPAL INVESTIGATOR(S): Janis, D.B.
PHONE: C(406)449-3780
RESEARCH INSTITUTE: Montana Dept. of Natural Resources and Conservation, Helena
SPONSOR: Northern Tier Pipeline Co., Helena, Mont.
FUNDING: 1978-$388,300
LOCATION: MT
ABSTRACT: The Northern Tier Pipeline Company is proposing to build a crude oil pipeline from Port Angeles, Washington to Clearbrook, Minnesota. Approximately 650 miles of pipeline would cross Montana. Several Billings refineries will receive crude oil from the pipeline.
RECORD NUMBER: OWRC-1152
RIP NUMBER: 008111

PETROLEUM
    POLICY, LEGISLATION, AND REGULATION

<1115>
PROJECT TITLE: Oil and gas lease applications exploration and development, Flathead National Forest--USDA Forest Service environmental impact statement
DURATION: 03/75-04/76
PRINCIPAL INVESTIGATOR(S): Corpe, E.L.
PHONE: C(406)755-5401
RESEARCH INSTITUTE: Forest Service, Kalispell, Mont. (USA). Flathead National Forest
SPONSOR: Forest Service, Washington, D.C.
LOCATION: MT
ABSTRACT: Oil and gas lease applications have been received on 236,000 acres of National Forest lands in Flathead County, Montana. The action of this statement consists of Forest Service recommendations to the U.S. Department of Interior, Bureau of Land Management, State Office, Billings, MT. The recommendations are as follows: (1) the denial of leases on approximately 53,000 acres; (2) the granting of leases with special stipulations on approximately 59,000 acres; (3) the granting of leases with a no-surface occupancy stipulation of approximately 32,000 acres; and (4) the deferment of leases on approximately 92,000 acres. The BLM is the agency responsible for the management of the vegetation and other surface resources on the National Forest Lands.
REPORTS AND PUBLICATIONS: Oil and Gas Lease Applications Exploration and Development, R-1 75-11, Flathead National Forest, USDA Forest Service Draft EIS, June 19, 1975; Final EIS, April 30, 1976.
RECORD NUMBER: OWRC-1186
RIP NUMBER: 008723

IN SITU METHODS, TRUE AND MODIFIED

<1116>
PROJECT TITLE: Mathematical modeling and laboratory study of reverse and forward combustion in tar sands
PROJECT NUMBER: 002 EY-77-C-04-3913
DURATION: 09/77-08/78
PRINCIPAL INVESTIGATOR(S): Aer, A.F.
PHONE: C(307)766-2122
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Dockter, L. P.O. Box 3395, LERC, University Station, Laramie, WY 82071
FUNDING: 1977-$57,900
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center is engaged in a program to investigate the feasibility of recovering oil from tar sand beds by in situ combustion processes. To this end a program including field experiments, laboratory experiments and analytical and mathematical modeling is being conducted. The purpose of this program is to develop numerical models describing the in situ recovery of oil from tar sands and to obtain physical and kinetic data through laboratory experimentation to help understand reverse and forward combustion recovery techniques for tar sands. Specifically, the following tasks will be performed: (1) Mathematical Modeling: expand on the fluid dynamics model under contract E(29-2)-3690 to include combustion reaction kinetics and material and energy balances; evaluate fluid dynamics model accuracy using results obtained from in situ field project airflow tests if possible; check validity of combustion model with available field data and utilize model to help design future field site experiments; and define areas in which additional data is required to improve model accuracy. (2) Laboratory Experimentation: continue experimental program initiated under previous contract investigating the kinetics of the combustion reaction in tar sands at conditions anticipated in a field in situ recovery operation; and conduct a literature search for data on the thermal conductivity and diffusivity of tar sands, and if necessary initiate laboratory program to determine the effects of rock properties and fluid saturation on the thermal conductivity/diffusivity.
RECORD NUMBER: OWRC-1088
RIP NUMBER: 007637

IN SITU METHODS, TRUE AND MODIFIED (CONTINUED)

<1117>
PROJECT TITLE: Design and support for radioactive tracer injection and detection system
PROJECT NUMBER: 013 EY-77-C-04-3913
DURATION: 02/77-09/77
PRINCIPAL INVESTIGATOR(S): Doerges, J.
PHONE: C(307)766-3277
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Dockter, L. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1977-$20,800
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center has for many years used radioactive tracers to help evaluate underground fracture systems at field sites. The injection and detection apparatus being used at present needs to be up-dated to improve sensitivity and to ensure safe operating conditions. The purpose of this proposal is for the RMIEE to design, build and calibrate the following: (1) a krypton-85 injection system, (2) a high efficiency portable detection system, and (3) a signal pick-off and cable driver electronics to run from the detection system to LERC's existing tracer electronics.
RECORD NUMBER: OWRC-1082
RIP NUMBER: 007626

(SEE ALSO 1123)

<1118>
PROJECT TITLE: ORD and CD of chiral alkanes
PROJECT NUMBER: EY-77-C-04-3913
DURATION: 03/77-09/77
PRINCIPAL INVESTIGATOR(S): Asplund, O.
PHONE: C(307)766-4360
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Farrier, D. P.O. Box 3395, LERC, University Station, Laramie, WY 82071
FUNDING: 1977-$11,100
LOCATION: WY
ABSTRACT: The purposes of this program are to: (1) study optical activity of shale oils and model compounds identified in shale oil; (2) obtain ORD and CD spectra of shale oils and model compounds; (3) prepare conversion matrices and spectra of each; and (4) check CD spectra of shale oils for presence of optically active olefins.
RECORD NUMBER: OWRC-1095
RIP NUMBER: 007630

<1119>
PROJECT TITLE: Thermal decomposition of kerogen under elevated pressure
PROJECT NUMBER: 009 EY-77-C-04-3913
DURATION: 04/77-08/78
PRINCIPAL INVESTIGATOR(S): Noble, R.; Harris, G.
PHONE: C(307)766-6192;C(307)766-3170
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Dockter, L. Dept. of Energy, LERC, P.O. Box 3395, Laramie, WY 82071
FUNDING: 1977-$79,100
LOCATION: WY
ABSTRACT: The only practical technique to date for recovering oil from oil shale through thermal decomposition of the organic material; this can either be accomplished in above ground retorts or through in situ processes. Various schemes have been proposed to mathematically describe the thermal decomposition of kerogen such as using bitumen, oil, gas and carbon residue as products. These schemes suffer from shortcomings: (1) all of the extensive data now available were obtained at atmospheric pressure, and (2) these data were obtained prior to development of techniques to enable analysis for gas and liquid product distribution. Since oil shale processing may take place at a variety of elevated pressures, it is extremely important to include the effect of pressure on the kinetics of the kerogen decomposition. The proposal requests the following services be performed: (1) Obtaining experimental data on the products formed during

<1119> CONT.
the thermal decomposition of kerogen under elevated ambient pressure in an inert atmosphere. (2) Analyzing the product gas and oil to determine product distributions, including alkanes, polar, olefins, and aromatics present. Simulated distillation of each functional group present will further characterize the oil. (3) Developing a kinetic model for kerogen decomposition which incorporates the effect of pressure and temperature.
RECORD NUMBER: OWRC-1081
RIP NUMBER: 007627

(SEE ALSO 1086)

<1120>
PROJECT TITLE: Upgrading of Green River shale oil naphtha by mild oxidation
PROJECT NUMBER: PL73590 EY-77-C-04-3913
DURATION: 09/77-12/77
PRINCIPAL INVESTIGATOR(S): Duncan, W.E.
PHONE: C(307)766-3332
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center: Wyoming Univ., Laramie
PROJECT MONITOR: Smith, E.B. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1977-$10,300
LOCATION: WY
ABSTRACT: In order to assist LERC in pursuit of their goals relating to development of technology for in-situ processing of oil shale, coal, and tar sands, the following work will be conducted. (1) To develop a facility in close proximity to LERC capable of routine and standardized inorganic analysis for fossil fuel resources, oils, byproduct waters, and offgas bourne particulates. (2) To determine, implement and maintain current state-of-the-art procedures for analyses using alpha, beta, and gamma particle spectrometry combined with chemical concentration, neutron activation and other instrumental or wet chemical techniques as required. (3) To implement data acquisition and storage facilities for handling developed routine analytical results. (4) To advance existing alpha, beta, and gamma particle spectrometric methodology for analysis of inorganic samples derived from in situ fossil fuel processing in terms of sample recovery efficiency detection sensitivity, precision and absolute accuracy of results. (5) To develop new applications of radiological analysis with respect to LERC environmental research needs or other techniques where radioassay proves not the most suitable. (6) Analyze representative samples of fossil fuel resources and products demonstrating the capability developed.
RECORD NUMBER: OWPC-1093
RIP NUMBER: 007632

<1121>
PROJECT TITLE: Microtopological investigation of nahcolite and its thermal decomposition products
PROJECT NUMBER: PL73001 EY-77-C-04-3913
DURATION: 07/77-12/77
PRINCIPAL INVESTIGATOR(S): Howatson, J.
PHONE: C(307)766-4370
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center
PROJECT MONITOR: Poulson, R. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1977-$23,900

<1121> CONT.
LOCATION: WY
ABSTRACT: Dr. Howatson will conduct a detailed microtopological investigation primarily by X-ray diffraction and by optical and scanning electron microscopy of the products from thermal treatment of nahcolite. The types of nahcolite to be investigated will include forms found at depths below 1812 feet in core from the U.S. Bureau of Mines Observation Well 02-A. In addition, the principal investigator will analyze selected samples for minor element content by x-ray fluorescence spectroscopy.
RECORD NUMBER: OWPC-1092
RIP NUMBER: 007633

(SEE ALSO 1098, 1213, 1221, 1222)

<1122>
PROJECT TITLE: Biochemical studies with aqueous effluents derived from in situ fossil fuel extraction technologies
PROJECT NUMBER: FL73423 EY-77-C-04-3913
DURATION: 12/76-01/78
PRINCIPAL INVESTIGATOR(S): Nelson, K.P.
PHONE: C(307) 766-6482
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center
PROJECT MONITOR: Farrier, D.S. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2274
FUNDING: 1977-$19,700
LOCATION: WY
ABSTRACT: The objectives of this program are to evaluate the effects of aqueous effluents derived from in situ oil shale processing on various biochemical parameters in rats and fish. Three tasks are to be performed: (1) Task: Determine the concentration dependency of retort water on enzyme induction. Purpose: Recent in vitro and in vivo studies have established that rats maintained on retort water exhibit induction of liver enzyme activity. This task is to determine through in vitro studies the concentration dependency and direct interaction of retort water with metabolic enzyme systems. (2) Task: Determine the effects of retort water on liver enzyme activity in rainbow trout under flow-through exposure conditions. (3) Task: Determine lactate dehydrogenase isoenzyme levels in selected rat and trout organs; determine and evaluate changes in LDH levels resulting from exposure of the organisms to retort water. Rationale: Enzyme induction is important toxicologically because it alters the biotransformation of various toxicants and can in fact lead to damage to the liver. Therefore enzyme induction is one biochemical parameter that should be studied to evaluate the potential effects of retort water.
RECORD NUMBER: OWRC-1089
RIP NUMBER: 007636

<1123>
PROJECT TITLE: Characterization of in situ fossil fuel processing effluents by microwave spectroscope
PROJECT NUMBER: 010 EY-77-C-04-3913
DURATION: 11/76-12/77
PRINCIPAL INVESTIGATOR(S): Rinehart, E.
PHONE: C(307) 766-4303
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Poulson, R. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1976-$9,000; 1977-$20,700
LOCATION: WY

<1123> CONT.
ABSTRACT: Environmental considerations demand that the effluent gases generated in oil shale retorting processes be subject to unambiguous analysis. Past methods of such analysis include wet-chemical methods and Gas Chromatography-Mass Spectrometry techniques. Both are subject to interferences from compounds other than the compound in question, although sensitivities can be quite good. A technique is required then, which is general in application but highly specific in compound identification. Analytical Microwave Spectrometry offers both of these desirable features. The recognized resolution and inherent specificity of microwave spectrometry for polar molecules make it a feasible technique for gas analysis. The desirable ultimate goal of a program of research in Analytical Microwave Spectroscopy is that of achieving routine operation at least in identifying specific components of a mixture. Several tasks must be completed before that goal can be met, including cataloging of standard compounds and achieving automated operation for both standards and unknown samples.
RECORD NUMBER: OWRC-1087
RIP NUMBER: 007638

<1124>
PROJECT TITLE: Interactions of soil microorganisms with aqueous effluents derived from in-situ fossil fuel processing
PROJECT NUMBER: 018 EY-77-C-04-3913
DURATION: 09/77-09/78
PRINCIPAL INVESTIGATOR(S): Williams, S.E.; Christensen, M.; Moore, T.S.
PHONE: C(307) 766-2179
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center
PROJECT MONITOR: Farrier, D.S. P.O. Box 3395, LERC, Univ. Station, Laramie, WY 82071, C(307)721-2274
FUNDING: 1977-$54,900
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center is currently developing the technology for in-situ processing of oil shale, coal, and tar sands. Attendant with these processes is the copious production of aqueous waste effluents which pose a number of environmental concerns. The specific research topics which are to be addressed in this research are: (1) the effect on in-situ produced aqueous effluents on soil organisms (i.e., bacteria, fungi, actinomycetes) in an undisturbed environment; (2) the effect of in-situ produced aqueous effluents on parameters indicative of soil microbial activity (i.e., carbon dioxide evolution, dehydrogenase activity, nitrogenase activity, pH, and organic matter content); and (3) the effects of soil-born microorganisms on altering constituents of in-situ produced aqueous effluents.
RECORD NUMBER: OWRC-1083
RIP NUMBER: 007625

<1125>
PROJECT TITLE: Hydrogeochemical and stream sediment reconnaissance for uranium
PROJECT NUMBER: LASL 77-34
DURATION: 06/78-09/78
PRINCIPAL INVESTIGATOR(S): Davidson, A.G.; Davidson, R.A.
PHONE: C(406)657-2343
RESEARCH INSTITUTE: Eastern Montana Coll., Billings. Dept. of Biology
SPONSOR: Los Alamos Scientific Lab., N.Mex.
PROJECT MONITOR: Nunes, H. Group W, LASL, Los Alamos, NM 87545, C(505)667-3051
FUNDING: 1978-$50,000
LOCATION: MT
ABSTRACT: The project seeks to obtain a total of 3500 stream, well, spring and stream bottom samples in the two study map areas of Billings and Roundup, Montana. Samples taken will give information on uranium concentrations and forty-two other elements associated with ground and surface waters. Eight students in Biology, Chemistry, and Geology have been selected to collect the samples between June and September. Field samples will be processed in the Biology Department and prepared for shipment to the University of California Laboratory at Los Alamos, New Mexico.
RECORD NUMBER: OWRC-1226
RIP NUMBER: 009879

<1126>
PROJECT TITLE: Financial and legal aspects of uranium mill tailings management
PROJECT NUMBER: 1-064-01-444-00
DURATION: 06/77-10/77
PRINCIPAL INVESTIGATOR(S): Ziskind, R.; Hausknecht, D.; Dwyer, B.; Grange, F.
PHONE: C(213)553-2705
RESEARCH INSTITUTE: Science Applications, Inc., Los Angeles, Calif.
COOPERATOR: Argonne National Lab., D.A. Brodnick, 9700 South Cass Avenue, Building 11A, Argonne, IL 60439
SPONSOR: Nuclear Regulatory Commission, Washington, D.C.
PROJECT MONITOR: Miller, R. Nuclear Regulatory Commission, Washington, DC, C(301)427-4205
LOCATION: WY;SD
ABSTRACT: Alternative financing approaches have been evaluated for assuring short-term tailings stabilization and reclamation and long-term monitoring and maintenance (M and M). Underlying issues were examined including: a review of the NRC regulatory requirements and authority for mills and tailings management; identification of state regulatory authority over all reasonably possible circumstances of land ownership and mill operatorship; an examination of NRC and individual state bonding authority; and discussion of current and proposed legislation to provide M and M funding. Three categories of financing alternatives for long-term M and M were considered: uranium product taxation; surety bonds and other performance guarantees; and mill operator generated funds. Only specific approaches within the last categories were deemed acceptable. These alternatives were: an earmarked annuity managed by the regulatory body; purchased investment securities managed by the operator during the active milling period: lump sum final payment secured by surety bonding. In order to assure site access to perform M and M it is recommended that title transfer of the reclaimed tailings areas be required. There appears to be no impediment to implementing this requirement under existing state authority for non-federally owned land.
REPORTS AND PUBLICATIONS: SAI-260-78-520, Uranium Mill Tailings Waste Management, available from Science Applications, Inc., 1801 Avenue of the Stars, Suite 1205, Los Angeles, CA 90067.
RECORD NUMBER: OWRC-1211
RIP NUMBER: 009242

OTHER SYNTHETIC AND NATURAL FUELS
HYDROCARBON FUELS

PREPARATION FROM WASTES OR BIOMASS

<1127>
PROJECT TITLE: Comprehensive survey of biological methane production from agricultural, domestic, and industrial resources of Montana
PROJECT NUMBER: RAE 402
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Ward, D.M.
PHONE: C(406) 994-2902
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Microbiology
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$23,900
LOCATION: MT
ABSTRACT: This project will study the conversion of four sources (cattle manure, wheat straw, domestic sewage, and industrial hot water waste) of energy-rich organic matter available in large quantity in Montana to methane. The study will focus on establishing whether methane production reactions limit the rate of methane production and also the efficiency of conversion of wastes to methane. The study is expected to result in (1) establishment of basal rates of methane production for all four wastes, and (2) the potential to increase efficiency of conversion to methane by a factor of three or greater, (3) the potential to accelerate the rate of waste conversion to methane, (4) greater stability in the digestion of all four wastes, and (5) the framework for rapid production of methane from sunlight via production and decomposition of algal mats in thermal wastewater effluents. Until methane production from these resources of Montana is studied in prototype digestors this enormous pool of energy-rich materials cannot be efficiently converted to a useful fuel and remain a problem of disposal to the environment.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports are submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1117
RIP NUMBER: 008076

OTHER SYNTHETIC AND NATURAL FUELS
ALCOHOL FUELS

PREPARATION FROM WASTES OR BIOMASS

<1128>
PROJECT TITLE: Feasibility of ethanol from Montana grain
DURATION: 07/77-12/77
PRINCIPAL INVESTIGATOR(S): Stroup, R.L.; Miller, T.
PHONE: C(406) 994-3701
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Agricultural Experiment Station
SPONSOR: Montana State Univ., Bozeman. Agricultural Experiment Station
FUNDING: 1977-$10,000
LOCATION: MT
ABSTRACT: The purpose of this project was to assess the feasibility of making ethanol from grain in Montana, along with the desirability of a wheat producer's check-off levy to finance an ethanol plant. The study concluded that fermentation alcohol, outside of the legally protected potable alcohol market, could not pay its way in Montana. The resources required to produce it and its by-products are more valuable in other uses than the outputs themselves. This is reflected in costs and revenues, so that an unsubsidized plant even in the midwest is projected by most observers to be a large financial loser. Montana costs would be much higher, and revenues lower, to make losses even larger. A very large subsidy could make an ethanol plant financially feasible, but inputs used up would be more valuable than outputs produced. To an analyst concerned with efficiency or net social benefits, fermentation alcohol would not be feasible. To one concerned only with the welfare of producer groups, feasibility would depend on how heavily others could be made to subsidize the project. Producers would hurt themselves financially if they were to try, by a checkoff levy, to finance such a project. For any given subsidy expenditure, both grain producers and society in general would gain more from deficiency payments, for example, than from the very inefficient process of producing ethanol from grain for fuel or industrial use in Montana.
REPORTS AND PUBLICATIONS: Feasibility of Ethanol from Grain in Montana, by Richard L. Stroup and Thomas Miller, Montana Agricultural Experiment Station Research Report 118, January 1978.
RECORD NUMBER: OWRC-1149
RIP NUMBER: 008129

DRO ENERGY
(SEE ALSO 1131)
RESOURCES AND AVAILABILITY
(SEE ALSO 1184)

<1129>
PROJECT TITLE: Resource survey of low-head hydroelectric potential--Columbia River Basin/Idaho, Oregon, Washington, Montana
PROJECT NUMBER: G and C 595
DURATION: 09/77-07/79
PRINCIPAL INVESTIGATOR(S): Cunningham, A.
PHONE: C(406)994-2111
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Civil Engineering
COOPERATOR: Idaho Water Resources Research Institute
SPONSOR: Department of Energy, Washington, D.C.
PROJECT MONITOR: Gladwell, J. Idaho Water Resources Research Institute, Moscow, ID
FUNDING: 1978-$10,000
LOCATION: MT;OR;WA;ID
ABSTRACT: This study will review the potential for low-head hydro development in existing impoundments and evaluate the potential in currently undeveloped sites. The entire Columbia River drainage within the U.S. will be covered. The objectives of this project will be: (1) to review the records of existing private and public water impoundments that have a potential for low-head hydroelectric energy development and (a) determine why no energy development was originally installed, and (b) determine the potential for energy development; and (2) to survey the designated region for potential low-head energy developments, including the potential energy available at each site.
REPORTS AND PUBLICATIONS: Quarterly progress reports will be prepared. Final report will be available about 8/79.
RECORD NUMBER: OWRC-1173
RIP NUMBER: 007970

HYDRO ENERGY
ENVIRONMENTAL ASPECTS
(SEE ALSO 1214, 1215)

<1130>
PROJECT TITLE: Ex post facto analysis of Army Corps of Engineers and Bureau of Reclamation projects in Montana concerning the execution of pre-project commitments to minimize adverse environmental impacts and assess energy benefits
PROJECT NUMBER: OWRT No. A-106 Montana Acct. No. 572
DURATION: 10/77-09/78
PRINCIPAL INVESTIGATOR(S): Konizeski, R.L.; Ciliberti, V.A.
PHONE: C(406)243-6614
RESEARCH INSTITUTE: Montana Univ., Missoula. Forest and Range Experiment Station
SPONSOR: Office of Water Research and Technology, Washington, D.C. ; Montana Univ., Missoula. Forest and Range Experiment Station
FUNDING: 1978-$9,500
LOCATION: MT
ABSTRACT: Objectives: To assess the degree to which ex ante commitments have been realized and the projects effects upon stream channels and flood plain morphology. Projected vs. realized energy production will also be assessed. Approach: (1) An evaluation of pre-project commitments and execution concerning compensation and mitigation of primary and secondary losses to state and private holdings. (2) Review construction practices regarding stream channelization, borrow pits, vegetation, and reclamation. (3) Examine operating techniques and their effects as exemplified by fluctuations in stream and pool levels. (4) Assess physical changes in stream and flood plain morphology. (5) Review status of electric energy production over time. (MEO)
RECORD NUMBER: OWRC-1162
RIP NUMBER: 007955

<1131>
PROJECT TITLE: Renewable energy demonstration project
PROJECT NUMBER: C-77-02
DURATION: 07/77-06/78
PRINCIPAL INVESTIGATOR(S): Brown, S.; Kissner, J.A.; Hodge, J.R.
RESEARCH INSTITUTE: Montana International Trade Commission, Butte
COOPERATOR: Montana Energy and MHD Research and Development Institute, Box 3809, Butte, MT 59701
SPONSOR: Economic Development Administration, Washington, D.C.
LOCATION: MT
ABSTRACT: There are currently numerous private, state and federal agencies involved in answering research questions concerning renewable energy technologies such as solar, wind and lowhead hydro. Due to the marginal economic competitiveness of those technologies, many of the technological questions which have been answered in lab testing have not been highly demonstrated in field applications. Consequently, this project is directed at promoting infield renewable energy development through identifying existing facilities at Glasgow Air Force Base which would lend themselves to demonstrating one or more renewable technologies as well as exploring opportunities for manufacturing solar, wind and lowhead hydro components.
RECORD NUMBER: OWRC
RIP NUMBER: 008124

<1132>
PROJECT TITLE: Solar energy meteorological research and training site, Region 5 (Idaho, Montana, Oregon, Washington, and Wyoming)
DURATION: 09/77-09/82
PRINCIPAL INVESTIGATOR(S): Hewson, E.W.; Nagaraja Rao, C.R.
PHONE: C(503)754-4557
RESEARCH INSTITUTE: Oregon State Univ., Corvallis. Dept. of Atmospheric Science
SPONSOR: Department of Energy, Washington, D.C.
PROJECT MONITOR: McDaniels, D.K. University of Oregon, Physics Dept., Eugene, OR 97401
FUNDING: 1978-$200,000
LOCATION: ID;MT;OR;WA;WY
ABSTRACT: The project objectives include: (1) to establish a primary solar radiation and related meteorological measurements and research facility at Oregon State University, Corvallis; (2) to develop an academic year training program at Oregon State University with new courses on the theory and measurement of solar radiation; (3) to conduct summer workshops on solar energy measurement and instrumentation techniques and to organize a seminar series on solar energy related topics; and (4) to expand the statewide network of solar radiation monitoring stations, presently maintained by the University of Oregon, Eugene, to include the remaining four states of the region. Planned activities include: (1) radiation climatology of the Pacific Northwest; (2) passage of solar radiation in clouds and fogs; (3) radiative transfer in cloudy, turbid atmospheres; (4) multispectral radiometric and polarimetric investigations of atmospheric turbidity; (5) radiative properties of surfaces; (6) photometry of the daytime sky; and (7) interpolation among solar radiation measurement stations in mountainous terrain.
RECORD NUMBER: OWRC-1197
RIP NUMBER: 008734

<1133>
PROJECT TITLE: Weather station for Solar Heights Subdivision
PROJECT NUMBER: RAE 086
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Stewart, T.
PHONE: C(406)458-9729
RESEARCH INSTITUTE: Thomas Stewart, Helena, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$3,000
LOCATION: MT
ABSTRACT: The proposal is for weather measuring equipment and a small solar heated building to house the instruments. The weather station is one phase planned for a systematic development of a major subdivision in the Helena area which is being designed and planned for persons specifically interested in constructing homes that will use solar or other alternative

<1133> CONT.
energy methods. The weather station will be located in the subdivision. The funding will be used to help stimulate the development of the subdivision for solar residences.
RECORD NUMBER: OWRC-1125
RIP NUMBER: 008082

SPACE HEATING AND AIR CONDITIONING

<1134>
PROJECT TITLE: Solar heating and domestic hot water/photovoltaic/wind electric system
PROJECT NUMBER: RAE 072
DURATION: 01/78-01/79
PHONE: C(406)728-0015
RESEARCH INSTITUTE: AERO-West, Missoula, Mont.
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$6,500
LOCATION: MT
ABSTRACT: AERO-West wishes to retrofit the Horizon House and install various alternative energy devices so that the house will become a model for the public to visit, look at or do research and information gathering on alternative energy and energy conservation systems. This project will demonstrate a wind electric and photovoltaic, electrical system. It will also demonstrate an active, liquid, 300 square foot solar space heating system in which the collectors will be mounted on the ground adjacent to the building. Sixty square feet of additional collector area will be used for domestic hot water preheating. A portion of the fund will be used to purchase educational material for the renewable energy library that is housed in the building.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1135
RIP NUMBER: 008068

<1135>
PROJECT TITLE: Solar space heating in Fort Benton United Methodist Church
PROJECT NUMBER: RAE 062
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Wood, B.
PHONE: C(406)739-4344
RESEARCH INSTITUTE: Brian Wood, Loma, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$9,900
LOCATION: MT
ABSTRACT: This project will demonstrate a 2,000 square foot liquid, trickle-type collector system that will be retrofit onto a church. The church will upgrade its building insulation to make it a more energy efficient structure. A major goal of this demonstration project is to illustrate that homeowners, organizations with heated facilities, contractors, and carpenters can build and install low cost and practical solar space heating systems without the mystery, complexity and apprehension usually associated with this subject.

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1135> CONT.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1128
RIP NUMBER: 008083

<1136>
PROJECT TITLE: Alternative energy systems for mobile homes
PROJECT NUMBER: RAE 048
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Fowlkes, C.
PHONE: C(406)587-3779
RESEARCH INSTITUTE: Charles Fowlkes, Bozeman, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$25,000
LOCATION: MT
ABSTRACT: This project will involve a side-by-side comparison of two well-insulated mobile homes, one using a liquid solar heating system while the other uses an air system. Since space is limited in a mobile home, the storage will be built into the pad for the trailer located directly underneath it. This will enable the storage to be easily coupled to the hot air heating system that is conventional in most mobile homes currently being produced. All components of this system will be heavily monitored and analyzed in a scientific manner. The final results of this project will be a plan for two types of solar heating systems that can be built and integrated with a mobile home. System plan, performance and cost will be known in advance for someone wishing to build a similar system.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1110
RIP NUMBER: 008069

<1137>
PROJECT TITLE: Active solar hot water heating of a solar greenhouse
PROJECT NUMBER: RAE 060
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Orvis, J.
RESEARCH INSTITUTE: James Orvis, Bozeman, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$6,600
LOCATION: MT

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1137> CONT.
ABSTRACT: This project will demonstrate a low cost, 84 square foot, home-built, greenhouse that will be used to extend the growing season late into the fall and start it early in the spring. It will use 24 square feet of liquid collectors and a 220 gallon storage area to supply night time heating. This will provide an example for those people who wish to grow a large share of their own vegetables and thus reduce the demand for energy intensive, out-of-state produce.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1130
RIP NUMBER: 008085

<1138>
PROJECT TITLE: Solar domestic hot water preheating/home heating wood backup heating
PROJECT NUMBER: RAE 040
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Alexander, J.
PHONE: C(406)932-3345
RESEARCH INSTITUTE: John Alexander, Big Timber, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$10,500
LOCATION: MT
ABSTRACT: This project involves an active, solar air heating system in which the exposed southern roof area, 480 square feet, will be glazed with the entire attic serving as the solar collector. The heated air from the attic will be circulated to a rock storage area. A domestic hot water preheating tank will be located in the rock storage area. A Bippert wood furnace and two, high-efficiency fireplaces will also supply home heat.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1119
RIP NUMBER: 008077

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1139>
PROJECT TITLE: Solar home heating and domestic hot water preheating retrofit system
PROJECT NUMBER: RAE 029
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Leighty, M.
PHONE: C(406)232-1568
RESEARCH INSTITUTE: Max Leighty, Miles City, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$3,200
LOCATION: MT
ABSTRACT: This is a retrofit project employing a home-built, active solar air heating system (270 square feet), rock storage, and a domestic hot water preheating system. The entire project will be built by the applicant. It will include outfitting five storm windows, enclosing entranceways from outside, and adding roof insulation. The storm window cost is not funded by this grant.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: ONRC-1112
RIP NUMBER: 008070

<1140>
PROJECT TITLE: Laboratory heated by solar energy
PROJECT NUMBER: RAE 051
DURATION: 01/79-01/79
PRINCIPAL INVESTIGATOR(S): Herndon, C.
PHONE: C(406)792-8321
RESEARCH INSTITUTE: Montana Coll. of Mineral Science and Technology, Butte. Mineral Research Center
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$13,600
LOCATION: MT
ABSTRACT: This project will investigate in a scientific manner, the efficiency of a liquid-to-air heat pump, coupled with a liquid solar-heating system. The performance of several different kinds of liquid collectors will also be monitored. All equipment will be used to heat an office area in the Mineral Research Center. Two goals of the project are (1) a properly designed solar energy utilization system affordable by home-owners; and (2) a computer program for sizing and selection of components for the whole system.

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1140> CONT.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: ONRC-1118
RIP NUMBER: 008064

<1141>
PROJECT TITLE: Solar home heat and domestic hot water preheating/heat pump backup
PROJECT NUMBER: RAE 047
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Solenes, N.
PHONE: C(406)259-7464
RESEARCH INSTITUTE: Norm Solenes, Billings, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$10,800
LOCATION: MT
ABSTRACT: This project involves the use of a 360 square foot passive collector system with liquid storage, liquid domestic hot water preheating system, and a heat pump for backup heating. The working fluid in this passive collector design will be freon.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: ONRC-1111
RIP NUMBER: 008071

<1142>
PROJECT TITLE: Solar home heating project
PROJECT NUMBER: RAE 025
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Bachtfertig, P.
PHONE: C(406)252-7421
RESEARCH INSTITUTE: Peter Bachtfertig, Billings, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$1,200
LOCATION: MT
ABSTRACT: This is a retrofit project employing a passive solar design with 98 square feet of southerly exposed window area. The window area will be covered with insulated shutters to reduce heat loss during cold, cloudy days and at night. Proving the value of the system will result in making a simple, low technology approach available for new and existing

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1142> CONT.
construction. Part of the installation is the design or modification of the duct work to draw warm air from the rooms with the windows, through the furnace fan, and distribute it through the house.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1113
RIP NUMBER: 008072

<1143>
PROJECT TITLE: Solar heating of a small commercial building
PROJECT NUMBER: RAE 006
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Morrow, P.
PHONE: C(406)656-8191
RESEARCH INSTITUTE: Phil Morrow, Billings, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$12,500
LOCATION: MT
ABSTRACT: This project will use 465 square feet of Northrup concentrating collectors for a liquid heating and absorption water chiller air conditioning system. The building, the Fargo Hotel, will be completely renovated in conjunction with this project. It has also been recognized as a historically significant building by the City of Billings.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1118
RIP NUMBER: 008073

<1144>
PROJECT TITLE: Solar heated carpenter shop
PROJECT NUMBER: RAE 065
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Schmitz, P.
PHONE: C(406)676-5069
RESEARCH INSTITUTE: Phillip Schmitz, Ronan, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$4,600
LOCATION: MT
ABSTRACT: This project will demonstrate a home-built, 480 square foot, air solar collector system with rock storage that will heat a carpenter shop. A

SPACE HEATING AND AIR CONDITIONING
(CONTINUED)

<1144> CONT.
wood burning stove will also be modified to allow its heat to be ducted into the storage area. The intent is to determine what percentage of the total heating demand will be provided by solar energy in a limited use situation typical of most all commercial and industrial buildings.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1132
RIP NUMBER: 008087

<1145>
PROJECT TITLE: Solar heated greenhouse
PROJECT NUMBER: RAE 061
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Steadman, S.
RESEARCH INSTITUTE: Stan Steadman, Glendive, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$1,200
LOCATION: MT
ABSTRACT: This project will demonstrate a 135 square foot attached greenhouse similar to those built in a Solar Sustenance Project in New Mexico. Heat will be stored for night time use in rows of 55 gallon barrels. This greenhouse should produce vegetables from early spring to late fall for this family.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1129
RIP NUMBER: 008084

DRYING AND CURING

<1146>
PROJECT TITLE: Solar-electric crop drying demonstration
DURATION: 08/76-09/77
PRINCIPAL INVESTIGATOR(S): Peterson, W.
PHONE: C(605)688-5141
RESEARCH INSTITUTE: South Dakota State Univ., Brookings
SPONSOR: South Dakota State Government, Pierre
FUNDING: 1977-$9,500
LOCATION: SD
ABSTRACT: This project is to build and demonstrate a solar-electric corn drying bin.
RECORD NUMBER: NGC;OWRC-1221
RIP NUMBER: 009252

WATER HEATING
(SEE ALSO 1130, 1138, 1139, 1141)

<1147>
PROJECT TITLE: Residential solar water heating system
PROJECT NUMBER: RAE 050
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Clowers, B.
RESEARCH INSTITUTE: Barbara Clowers, Great Falls, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$2,800
LOCATION: MT
ABSTRACT: This project is for a retrofit solar system for domestic water heating. The solar heating system will incorporate flat-plate hydronic collectors with a pre-heating water tank to be used with the existing water tank.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1131
RIP NUMBER: 008086

WATER HEATING
(CONTINUED)

<1148>
PROJECT TITLE: Construction and installation of solar hot water systems
PROJECT NUMBER: RAE 097
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Boggs, K.
PHONE: C(406)728-3710
RESEARCH INSTITUTE: District 11 Human Resources Development Council, Missoula, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$15,000
LOCATION: MT
ABSTRACT: This project will retrofit six, low-income homes with active, liquid, solar, domestic, hot water preheating systems. This is part of a continuing effort by District 11 to promote development of appropriate technology and to make the benefits immediately available to low-income households.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1120
RIP NUMBER: 008081

<1149>
PROJECT TITLE: Montana solar-assisted water heating facility and instrumentation program
PROJECT NUMBER: RAE 085
DURATION: 01/78-01/79
PHONE: C(406)755-7461
RESEARCH INSTITUTE: Pacific Power and Light Co., Kalispell, Mont.
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$3,000
LOCATION: MT
ABSTRACT: This project will demonstrate a premanufactured 58 square foot solar domestic hot water preheating system. This system will be heavily monitored by the applicant and should provide useful information as to the economic feasibility of this type of system in the Kalispell area. This program will complement the already existing network of instrumented solar heating facilities in PP and L's service area.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1126
RIP NUMBER: 008066

WATER HEATING
(CONTINUED)

<1150>
PROJECT TITLE: Solar hot water heating project
DURATION: 08/74-1979
PRINCIPAL INVESTIGATOR(S): Goldbach, W.R.
PHONE: C(503) 243-4554
RESEARCH INSTITUTE: Pacific Power and Light Co., Portland, Oreg.
SPONSOR: Pacific Power and Light Co., Portland, Oreg.
FUNDING: 1976-$11,800; 1977-$11,800; 1978-$14,000
LOCATION: WY;WA;OR
ABSTRACT: The objective is to demonstrate the practicality of using solar energy to supplement conventional methods of heating domestic water. Five demonstration units have been installed in Pacific Power and Light's service territory. Data are being accumulated on magnetic tape and analyzed for technical performance. The units are located at Pleasant Hill (Eugene), Tigard and Grants Pass, Oregon; Yakima, Washington; and Casper, Wyoming.
REPORTS AND PUBLICATIONS: Solar Water Heating, Pacific Power and Light, Progress Report, June 1977.
RECORD NUMBER: OWRC-1216
RIP NUMBER: 009247

<1151>
PROJECT TITLE: Solar heated swimming pool in Shelby, Montana
PROJECT NUMBER: RAE 078
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Kalbfleisch, R.
RESEARCH INSTITUTE: Shelby, City of, Mont.
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
LOCATION: MT
ABSTRACT: This project will demonstrate a large, municipal solar-heated swimming pool that can be used all year long. The proposed solar system will consist of a series of copper collectors situated on the roof of the pool. The heated water would be stored in either a tank or be pumped directly in the pool to heat the water, thus continuous solar heating could be achieved the entire 12 months of the year.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1127
RIP NUMBER: 008067

USA

<1152>
PROJECT TITLE: Phase zero study results--geothermal potential of the Madison group at shallow depth in eastern Montana
DURATION: 07/77-10/77
PRINCIPAL INVESTIGATOR(S): Sonderegger, J.L.; Bergantino, R.N.; Miller, M.R.
PHONE: C(406)792-8321 ext.241
RESEARCH INSTITUTE: Montana Bureau of Mines and Geology, Butte
SPONSOR: Energy Research and Development Administration, Washington, D.C.. Div. of Geothermal Energy; Montana State Government, Helena
FUNDING: 1977-$4,500
LOCATION: MT
ABSTRACT: The study of shallow geothermal potential in the Madison Group limestone aquifer was started to provide information about large-volume, low-temperature reservoirs that could have potential for space heating or for extended-crop-season irrigation. The report summarizes data available from federal and state sources. To date, eighty-one hot or warm springs are known in Montana. Twenty-nine of these springs are believed to originate in limestone of the Madison Group. (NEO)
REPORTS AND PUBLICATIONS: Report RLO-2426-T2-2 to ERDA, J.L. Sonderegger, R.N. Bergantino, and M.R. Miller, November 15, 1977, Open File copy with Hydrology Division, Montana Bureau of Mines and Geology.
RECORD NUMBER: OWRC-1182
RIP NUMBER: 007952

<1153>
PROJECT TITLE: Reconnaissance study of geothermal potential in the upper parts of Red Rock Creek and Madison River Valleys, southwestern Montana
DURATION: 07/77-09/79
PRINCIPAL INVESTIGATOR(S): Sonderegger, J.L.; Weinheimer, G.; Bermel, W.; Glasser, D.
PHONE: C(406)792-8321 ext.241
RESEARCH INSTITUTE: Montana Bureau of Mines and Geology, Butte
SPONSOR: Montana State Government, Helena ; Department of Energy, Washington, D.C.. Div. of Geothermal Energy
FUNDING: 1977-$28,300; 1978-$56,600
LOCATION: MT
ABSTRACT: The study of shallow geothermal potential in the Upper Red Rock Creek Drainage and the Lower Madison River Drainage is being conducted to evaluate the geothermal prospects of the area for any possible space-heating potential. This report includes some of the hydrologic field data obtained during the months of July through September, 1977, when 47 streams and 46 springs were field inventoried. Also there is a discussion of geologic mapping and an aerial thermal scan conducted during this same period.
REPORTS AND PUBLICATIONS: RLO-2426-T2-2 to ERDA, W. Bermel, D. Glasser, J.

<1153> CONT.
Sonderegger, November 15, 1977, Open file copy with Hydrology Division, Montana Bureau of Mines and Geology, Preliminary report of results of summer's field work.
RECORD NUMBER: OWRC-1181
RIP NUMBER: 007953

<1154>
PROJECT TITLE: Northwest regional planning support for the development of geothermal energy
DURATION: 09/77-09/78
PRINCIPAL INVESTIGATOR(S): Karr, D.J.
PHONE: C(503)882-6321 ext.144
RESEARCH INSTITUTE: Oregon Inst. of Tech., Klamath Falls
SPONSOR: Department of Energy, Richland, Wash.. Richland Operations Office
FUNDING: 1978-$383,400
LOCATION: AK;ID;MT;OR;WA;WY
ABSTRACT: The Geo-Heat Utilization Center of Oregon Institute of Technology will conduct a regional operations research and system analysis for commercial development of geothermal resources in the states of Alaska, Idaho, Montana, Oregon, Washington and Wyoming. Realistic time-sequence scenarios will be developed for KGRAs and PGRAs of record using existing data, institutional factors and economic conditions. Initial scenarios will be analyzed and updated after critical review by presentations to governmental agencies, industry, community leaders and special interest groups. Market and cost/benefit analyses and resource potential calculations will be performed for all scenario sites demonstrating commercial potential. Comparable projections will be made to the year 2020 between potential geothermal resource development and other energy sources. These tasks will be performed by project team members who are residents of respective states and the scenarios will reflect the states' desires for the development of their resources. (NEO)
REPORTS AND PUBLICATIONS: Monthly and quarterly progress reports will be submitted to ERDA. A report presenting and describing the preliminary regional geothermal energy development scenario, and a complete final report describing the activities of the project will be submitted to ERDA at conclusion of project.
RECORD NUMBER: OWRC-1176
RIP NUMBER: 007958

USA
(CONTINUED)

<1155>
PROJECT TITLE: Study of geothermal energy prospects in western states
DURATION: 06/75-05/76
PRINCIPAL INVESTIGATOR(S): Davidson, R.
PHONE: C(303)837-5851
RESEARCH INSTITUTE: Western Governors Regional Energy Policy Office, Denver, Colo.
SPONSOR: Old West Regional Commission, Washington, D.C. ; Four Corners Regional Commission
LOCATION: MT;WY;ND;SD;NE;NV;AZ;NM;CO;UT
ABSTRACT: Much of the territory of the Western Governors' Regional Energy Policy Office is underlain by a vast natural resource of geothermal energy in two forms: hydrothermal and hot dry rock. Every WGREPO state has at least some of this resource; the region as a whole has a large share of the total national resource; 84% of the federal land thus far leased for geothermal exploration is in WGREPO states. This study describes what geothermal energy is, where it is in the WGREPO states, and the potential amount recoverable. The remainder of the study covers hydrothermal and hot dry rock prospects and problems, and analyzes the technological, environmental, financial, and institutional barriers to geothermal development in the Western states.
REPORTS AND PUBLICATIONS: Geothermal Energy Prospects in the Western States, A Special Report to the Governors, May 1976, prepared by Ray Davidson for the Western Governors' Regional Energy Policy Office (inquire at Western Interstate Energy Board, 2500 Stapleton Plaza, 3333 Quebec, Denver, CO 80207, for availability).
RECORD NUMBER: OWRC-1136
RIP NUMBER: 008118

GEOPHYSICAL TECHNIQUES AND SURVEYS

<1156>
PROJECT TITLE: Reconnaissance study of mine-water temperatures in hardrock mining districts of Montana
DURATION: 05/76-05/78
PRINCIPAL INVESTIGATOR(S): Sonderegger, J.L.; Lawson, D.
PHONE: C(406)792-8321 ext.241
RESEARCH INSTITUTE: Montana Bureau of Mines and Geology, Butte
SPONSOR: Energy Research and Development Administration, Washington, D.C.. Div. of Geothermal Energy; Montana State Government, Helena
FUNDING: 1977-$10,800; 1978-$10,800
LOCATION: MT
ABSTRACT: Objectives are to measure mine water temperatures in up to three mines in each of the 250 hardrock mining districts and obtain data for the regional geothermal data base.
REPORTS AND PUBLICATIONS: RLO-2426-T2-1 to ERDA, Sonderegger, John L., and Don Lawson, January 1977, MBMG, Annual Report, copy available for inspection at Hydrology Division, MBMG.
RECORD NUMBER: OWRC-1178
RIP NUMBER: 007972

EXPLORATORY DRILLING AND WELL LOGGING

<1157>
PROJECT TITLE: Feasibility and pre-engineering planning of geothermal heating system for the new nursing home and present hospital facility in White Sulfur Springs, Montana
PROJECT NUMBER: RAE 501
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Bartos, J.
RESEARCH INSTITUTE: Mountainview Memorial Hospital, White Sulfur Springs, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$2,000
LOCATION: MT
ABSTRACT: The thrust of this project will be to drill a test well 121 feet deep and analyze the mineral content of the water temperature and flow rate. This project is a feasibility study for eventually heating the Mountainview Memorial Hospital with geothermally heated hot water. The funding is for the test well only.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Division, Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1116
RIP NUMBER: 008075

GEOTHERMAL ENERGY
ENVIRONMENTAL ASPECTS AND WASTE DISPOSAL

<1158>
PROJECT TITLE: Ecological genetics of trout adapted to the geothermally heated waters of Yellowstone Park
PROJECT NUMBER: A-107 MT
DURATION: 10/77-09/78
PRINCIPAL INVESTIGATOR(S): Cameron, D.G.: Vyse, E.R.
PHONE: C(406)994-2670
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Biology
SPONSOR: Office of Water Research and Technology, Washington, D.C.
FUNDING: 1978-$4,000
LOCATION: MT;WY
ABSTRACT: Hot water effluents emanating from energy developments, whether geothermal, nuclear, or fossil fuel in origin, are either a potential threat to trout fisheries in Western cold streams or are very expensive to cool. If a trout ecotype can be found that is pre-adapted to thermally enriched waters some of the fears associated with energy development could be allayed. There is an introduced rainbow trout population in the Firehole River that appears to complete its life cycle in the hotter reaches of this stream which drains several geyser basins. Previous studies on the behavioral ecology of Firehold trout convince us that the adaptation is real and that these trout are not somehow escaping the heat. We propose to search for unique alleles among the Firehole trout by conducting an electrophoretic survey of their enzymes and other proteins. If they evidence biochemical characteristics that differ from nearby cold water trout we will subject individuals to thermal tolerance tests and conduct breeding experiments with local hatchery phenotypes. Our goal is to ascertain the extent of genetic adaptation (evolution) that has accompanied thermal acclimatization and to estimate what would be involved in transferring these genes to strains of trout living in other drainage systems.
RECORD NUMBER: OWRC-1166
PIP NUMBER: 007964

GEOTHERMAL ENERGY
DIRECT ENERGY UTILIZATION
(SEE ALSO 1157)

<1159>
PROJECT TITLE: Western South Dakota usage of geothermal energy from the Madison Formation
PROJECT NUMBER: 2583 ET-78-S-07-1707
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Iszler, J.: Skilman, D.: Carda, D.D.: Beater, W.: Dunham, G.
PHONE: C(605)662-7939
RESEARCH INSTITUTE: South Dakota School of Mines and Technology, Rapid City
SPONSOR: Department of Energy, Idaho Falls, Idaho. Idaho Operations Office
PROJECT MONITOR: Brimhall, P.B. 550 Second Street, Idaho Falls, ID 83401
FUNDING: 1978-$85,000
LOCATION: SD
ABSTRACT: The objective of this project is to study the feasibility of using the hot water from the existing artesian wells at Edgemont to heat the building complex of the Edgemont School District.
RECORD NUMBER: ORRC-1212
PIP NUMBER: 009243

WIND ENERGY
(SEE ALSO 1131)
AVAILABILITY CLIMATOLOGY

<1160>
PROJECT TITLE: Wind-electric power generation in Montana
DURATION: 04/74-02/76
PRINCIPAL INVESTIGATOR(S): Obermeier, J.L.
PHONE: C(406)452-9558
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Mechanical Engineering
SPONSOR: Montana State Univ., Bozeman. Dept. of Mechanical Engineering
LOCATION: MT
ABSTRACT: This investigation considered the suitability of wind energy in Montana for generation of electric power delivered to residential electric loads. The major emphasis is directed toward small diversified systems, primarily in rural areas, however large wind system evaluation is included. The four-step approach included wind resource evaluation, estimation of energy production by wind energy conversion systems, energy supply to residential electric loads and economic evaluation. The evaluation of the wind resource, based on airport Weather Bureau records, provided the necessary wind characteristic information and identified high wind areas in Montana. The characteristic performance of wind machines, coupled with wind speed data, provided estimations of maximum attainable energy production from the wind. The results indicate that with the appropriate selection of wind energy conversion equipment and area of the state, it is possible to meet most residential electric requirements. Wind energy costs are generally higher than present utility electric rates, however lower costs are generally higher than present utility electric rates, however lower costs are possible in some cases and indications are that in the future the comparative position of wind power may improve.
REPORTS AND PUBLICATIONS: (1) Wind-Electric Power Generation in Montana, John L. Obermeier, 1976; (2) An Economic Evaluation of Small-Scale Wind Powered Electric Generation Systems, J.L. Obermeier, B.W. Townes, 76-WA/Ener-1, 1976, American Society of Mechanical Engineers.
RECORD NUMBER: OWRC-1148
RIP NUMBER: 008128

WIND ENERGY
WIND ENERGY ENGINEERING
(SEE ALSO 1134)

TURBINE DESIGN AND OPERATION

<1161>
PROJECT TITLE: Wind energy research project for the Fort Belknap Indian Reservation
PROJECT NUMBER: RAE 204
DURATION: 01/78-01/79
RESEARCH INSTITUTE: Ft. Belknap Planning Program, Harlem, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$2,000
LOCATION: MT
ABSTRACT: This project will assess the wind potential at two sites: one near a small tribal building in Hays and the other at a reservoir. The site in Hays will be for possible wind electric generation. The reservoir location will study wind water pumping potential. Since there is evidence that this particular location does get a considerable amount of wind, it is felt that a wind energy research project would be beneficial in seeking an alternative energy source for Fort Belknap Reservation.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1122
RIP NUMBER: 008079

<1162>
PROJECT TITLE: Homemade wind powered air compressor
PROJECT NUMBER: RAE 206
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Stockton, W.M.
RESEARCH INSTITUTE: William M. Stockton, Grassrange, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$2,000
LOCATION: MT
ABSTRACT: This project will demonstrate a homemade savonius type wind mill that will be used to power an air compressor. The use of compressed air is one of the cleanest ways to store energy. Air motors can be used by themselves, and in addition be used to power small electric generators, which can be activated at will.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1121
RIP NUMBER: 008078

WIND ENERGY
WIND ENERGY ENGINEERING

SITE CHARACTERISTICS

<1163>
PROJECT TITLE: Wind monitoring project
PROJECT NUMBER: BAE 202
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Gordon, J.
RESEARCH INSTITUTE: John Gordon, Cascade, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$2,000
LOCATION: MT
ABSTRACT: This is a project to monitor the wind power generation potential at a farm site 19 miles south of Cascade, Montana. The ultimate intent of this project is to install and operate a wind-powered electric system which will provide renewable energy to the residence. However, this proposal only includes the wind monitoring because it is necessary to establish wind power generation potential prior to investment in equipment. Instrumentation capable of measuring wind power generation potential will be operated for a minimum of 10 months. The recorded data will be analyzed from the standpoint of power generation at the site and an estimation of the theoretical energy output of several wind-powered electric systems will be made.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1123
RIP NUMBER: 0CR080

ELECTRIC POWER ENGINEERING
ENVIRONMENTAL ASPECTS
(SEE ALSO 1099, 1208, 1209)

<1164>
PROJECT TITLE: Role of the Bonneville Power Administration in the Pacific Northwest power supply system, including its participation in the hydro-thermal power program--a draft program environmental statement and planning report
DURATION: 06/75-09/78
PRINCIPAL INVESTIGATOR(S): Rodel, D.P.
PHONE: C(503)234-3361 ext.5137
RESEARCH INSTITUTE: Bonneville Power Administration, Portland, Oreg.
SPONSOR: Bonneville Power Administration, Portland, Oreg.
FUNDING: 1976-$1,333,300; 1977-$1,333,300; 1978-$1,333,300
LOCATION: WA;OR;ID;MT
ABSTRACT: This draft environmental impact statement describes the environmental impact of Bonneville Power Administration's participation in the regional power supply system in the Pacific Northwest, including the Hydro-Thermal Power Program, in order to provide a framework in which decisions facing BPA can be made. Particular emphasis is given to BPA's decisions concerning its relationship to the present system and power supply system alternatives for the future. The Role EIS is a programmatic statement which describes in broad terms the BPA program, the functions through which the program is administered, alternative programs and alternative implementing actions, and environmental impacts. The EIS is intended to insure that BPA's Administrator and other decisionmakers are informed of alternatives related to their decisions, impacts associated with each alternative, and potential environmental consequences. The statement was prepared in compliance with the National Environmental Policy Act of 1969. (NEO)
REPORTS AND PUBLICATIONS: The Role of the Bonneville Power Administration in the Pacific Northwest Power Supply System, Including Its Participation in the Hydro-Thermal Power Program, Draft Program Environmental Statement and Planning Report (DEC-77-21), prepared by Bonneville Power Administration, Department of the Interior, July 22, 1977, Part I: The Regional Electric Power Supply System, Part II: The Role of BPA, Appendix A: BPA Power Resources, Acquisitions, Planning and Operations, Appendix B: BPA Power Transmission, Appendix C: BPA Power Marketing, Summary Report.
RECORD NUMBER: OWRC-1153
RIP NUMBER: 008115

SITE SELECTION AND LAND USE

<1165>
PROJECT TITLE: Analysis and evaluation of the permit application: Units 1--3 of the Laramie River Station, Grayrocks Reservoir--transmission lines and associated facilities
DURATION: 12/75-02/76
PRINCIPAL INVESTIGATOR(S): Dinger, B.E.
PHONE: C(307)777-7368
RESEARCH INSTITUTE: Wyoming Office of Industrial Siting Administration, Cheyenn
SPONSOR: Basin Electric Power Cooperative, Bismarck, N.Dak.
FUNDING: 1976-$28,400
LOCATION: WY
ABSTRACT: The staff review suggests a number of specific categories of probable impact attendant to the proposed Laramie River Station. These include fuel, facility discharges, solid wastes, construction cost and construction schedule, capital facilities, Grayrocks Dam and Reservoir, ground water wells, and transmission lines.
RECORD NUMBER: NGC;OWRC-1205
RIP NUMBER: 009237

<1166>
PROJECT TITLE: Potential energy corridor requirements for the Pacific Northwest: long range, 1985--2020
DURATION: 01/76-04/77
PRINCIPAL INVESTIGATOR(S): Eastvedt, R.B.
RESEARCH INSTITUTE: Bonneville Power Administration, Portland, Oreg.
SPONSOR: Bonneville Power Administration, Portland, Oreg. ; Forest Service, Washington, D.C.
LOCATION: MT;WT;ID;WA;OR
ABSTRACT: A preliminary examination of long-range energy transportation requirements based on a variety of scenarios of load growth, generation methods and energy transportation methods. The report identifies the need to consider energy corridors associated with Great Plains coal reserves in regional planning.
REPORTS AND PUBLICATIONS: Potential Energy Corridor Requirements for the Pacific Northwest, Long Range, 1985--2020, Joint BPA/FS Work Group No. 1, copies available from Emmet E. Willard, Bonneville Power Administration, P.O. Box 3621, Portland, OR 97208.
RECORD NUMBER: OWRC-1196
RIP NUMBER: 008733

<1167>
PROJECT TITLE: Electrical system load survey: residential class
DURATION: 06/76-08/79
PRINCIPAL INVESTIGATOR(S): Winter, S.; Polzin, P.
RESEARCH INSTITUTE: Montana Power Co., Butte
SPONSOR: Montana Power Co., Butte ; Montana State Consumer Council, Helena
FUNDING: 1976-$78,400; 1977-$78,400; 1978-$78,400
LOCATION: MT
ABSTRACT: The objective is to secure 15-minute electrical demand data for a statistically-valid sample of Montana Power residential customers over a two year operating period. This data collection requires installation and service of approximately 200 recording meter installations. The subsequent analysis of the data is expected to produce input to cost of service studies for the utility.
REPORTS AND PUBLICATIONS: Electric Utilities Demonstration Project Proposal, by the Montana Public Service Commission to the U.S. Federal Energy Administration. In addition, a report has been submitted by MPC to the Legislature's Consumer Council Committee.
RECORD NUMBER: OWRC-1193
RIP NUMBER: 008730

<1168>
PROJECT TITLE: Federal regulatory framework: effects on mineral exploration and mine development on domestic public and private lands
PROJECT NUMBER: 404.1
DURATION: 01/77-01/78
PRINCIPAL INVESTIGATOR(S): Whitney, J.W.; Wobber, F.J.
PHONE: C(202)225-7685
RESEARCH INSTITUTE: John W. Whitney, Inc., Reno, NV
SPONSOR: Office of Technology Assessment (U.S. Congress), Washington, D.C.
PROJECT MONITOR: Wobber, F. Office of Technology Assessment, U.S. Congress, Washington, DC 20510
FUNDING: 1977-$8,000
LOCATION: NV
ABSTRACT: The problem is to prepare a preliminary evaluation of the relationship between the federal regulatory environment as expressed by federal land management laws, federal environmental laws, and federal health and safety laws, and mineral exploration and mine development on federal and nonfederal lands in the United States. An important goal of this analysis is to identify the effect of the federal laws on the nation's long term ability to develop the mineral supplies necessary to support its industrial base. The analysis required interviews with government and mining industry representatives, and an extensive literature survey. The focus of the report is on the effects of regulatory framework on mining industry functions, particularly at the exploration stage. The regulatory framework affects locateable, leaseable, and saleable mineral commodity development differently. Effects are also different for mineral exploration and mine development. Under current conditions, mineral exploration through mine development and construction takes more than 30 years and social constraints created to a large degree by the regulatory framework are such that the time required for mineral supply development may lengthen even more over the next 20 or 25 years. This study is part of Effects of Federal Laws, Policies and Practices on Access to Mineral Resources, With Emphasis on Non-Federal Lands.
REPORTS AND PUBLICATIONS: Federal Regulatory Framework: Effects on Mineral Exploration and Mine Development on Domestic Public and Private Lands, limited number of copies of working paper available for reference at Office of Technology Assessment, Washington, DC, Attn: Dr. Frank J. Wobber.
RECORD NUMBER: OWRC-1218
NIP NUMBER: 009249

<1169>
PROJECT TITLE: Rocky Mountain regional energy assessment program
DURATION: 1977
PRINCIPAL INVESTIGATOR(S): Lahrdine, R.
RESEARCH INSTITUTE: Los Alamos Scientific Lab., N.Mex.
SPONSOR: Energy Research and Development Administration, Washington, D.C.. Div. of Biomedical and Environmental Research
FUNDING: 1977-$750,000
LOCATION: AZ;CO;ID;MT;NV;NM;UT;WI
ABSTRACT: Under the auspices of the U.S. Energy Research and Development Administration, Division of Environmental and Biomedical Research, the Los Alamos Scientific Laboratory is engaged in a program assessing alternative energy development strategies for the Rocky Mountain West. The program's purpose is to identify and evaluate alternatives for utilization of the region's energy resources. Presently conducted under the LASL Regional Energy Assessment Program are projects on the following subjects: national coal utilization assessment, Upper Colorado River Basin optimization model, air quality and Rocky Mountain energy development, energy facility siting for the Water Resources Council, Indian Tribal interactions, health cost from energy generated pollutants, regional optimization model for energy resources, boom-town problems, and others.
REPORTS AND PUBLICATIONS: A list of Regional Energy Assessment Program publications is available from LASL.
RECORD NUMBER: OWRC-1187
RIP NUMBER: 008724

<1170>
PROJECT TITLE: Montana energy model
DURATION: 08/77-07/78
PRINCIPAL INVESTIGATOR(S): Jones, B.
PHONE: C(406)494-6100
RESEARCH INSTITUTE: Montana Energy and MHD Research and Development Inst., Inc., Butte
SPONSOR: Old West Regional Commission, Billings, Mont.
PROJECT MONITOR: Hoven, G.E. Old West Regional Commission, 228 Redden-Empire Building, Billings, MT 59101
FUNDING: 1977-$150,000
LOCATION: MT
ABSTRACT: A complete, dynamic energy-economic computer model of Montana will be developed which will be used to assess Montana energy supply and demand through the year 2000. Conventional energy forms, alternative energy sources, and energy supplies will be modeled. From these, a number of forecasts will be developed to give a prediction of the needs of Montana's primary, secondary, governmental, and household sectors. Also energy effects and capital constraints will be included which describe how

<1170> CONT.
changing energy policies and prices affect these sectors. This project is part of An Energy-Related Feasibility Study, and EIS for Reuse of Glasgow Air Force Base in Valley County, Montana.
RECORD NUMBER: OWRC-1189
RIP NUMBER: 008726

ENERGY MANAGEMENT AND POLICY
ECONOMICS AND SOCIOLOGY
(SEE ALSO 1168, 1175)

<1171>
PROJECT TITLE: Assistance from energy developers: a negotiating guide for small communities
DURATION: 01/77-07/77
PRINCIPAL INVESTIGATOR(S): Frankel, M.; Reiff, I.
PHONE: C(202)296-4100
RESEARCH INSTITUTE: Centaur Management Consultants, Washington, D.C.
SPONSOR: Energy Research and Development Administration, Washington, D.C.. Office of Planning, Analysis, and Evaluation
LOCATION: MT;WY;ND;SD;NE
ABSTRACT: The purpose of this report is to provide guidance to small communities on negotiating for assistance from energy developers. The report places the negotiating strategy into the context of a total program at the local level of assistance from numerous sources. A case study illustrates one method of determining fiscal implications of development which may be the impetus for the negotiations.
REPORTS AND PUBLICATIONS: Assistance from Energy Developers: A Negotiating Guide for Small Communities, ERDA Report.
RECORD NUMBER: OWRC-1179
RIP NUMBER: 007951

<1172>
PROJECT TITLE: Study of energy information needs, resources, and costs
DURATION: 05/78-07/78
PRINCIPAL INVESTIGATOR(S): Shaffer, D.; Middlestadt, J.; Cook, J.W.; Shaffer, C.; Simpson, T.
PHONE: C(614)267-6616
RESEARCH INSTITUTE: Cook (John W.) and Associates, Inc., Chagrin Falls, Ohio
SPONSOR: Old West Regional Commission, Billings, Mont.
PROJECT MONITOR: Blackburn, K.A. Old West Regional Commission, 228 Hedden, Empire Bldg, Billings, MT 59101, C(406)657-6665, F585-6665
FUNDING: 1978-$19,800
LOCATION: MT;ND;SD;WI;NE
ABSTRACT: Survey the energy data needs of the five Old West Regional Commission states by interviewing personnel in the energy offices and relevant state agencies, universities, etc. Determine availability of data from all levels of local, state, and federal government and private firms. Pinpoint data voids and research ways to fill such voids. Develop a set of alternatives for a data system to be later used in the modeling effort.
RECORD NUMBER: OWRC-1160
RIP NUMBER: 007956

<1173>
PROJECT TITLE: Powder River Basin report (draft)
DURATION: 04/76-12/76
PRINCIPAL INVESTIGATOR(S): York, M.; Freudenthal, S.
PHONE: C(307)777-7574
RESEARCH INSTITUTE: Wyoming State Planning Coordinators Office
SPONSOR: Wyoming Dept. of Economic Planning and Development, Cheyenne ; Old West Regional Commission, Billings, Mont.
FUNDING: 1976-$60,000
LOCATION: WY
ABSTRACT: This project was initiated to assess the secondary effects of resource development and to determine the optimum state role in relation to the other actors in the Powder River Basin (PRB), a region which is experiencing rapid and largely uncontrolled growth as a result of large scale mining activities. The paper examines the historical state role, a low key involvement emphasizing the promotion of economic growth. It concludes that this role must change and that state government must become more actively involved in rapid growth issues. The project's immediate purpose is to give state decision-makers information which will help them gain a full perspective on events in the PRB, develop forecasting abilities and design legislation and programs which will enable local governments to deal better with their problems. Its ultimate goal is to create a cohesive state policy and develop guidelines and priorities for involvement by the various segments of state government. Chapter I analyzes the historical development of the Basin and the extent and implications of current changes. Chapter II analyzes alternative futures based on several different mining and population growth assumptions. Chapter III identifies the major issues resulting from this growth, analyzes current state approaches, defines potential state activities, and makes recommendations. Issues are grouped in four categories: land use; water availability, development and allocation; service provision problems in impacted communities; and long range economic stability.
RECORD NUMBER: NGC;OWRC-1200
RIP NUMBER: 008875

<1174>
PROJECT TITLE: Year-round renewable energy demonstration center for the New Western Energy Show
PROJECT NUMBER: BAE 704
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Cochran, K.
PHONE: P259-1958
RESEARCH INSTITUTE: AERO, Billings, Mont.
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$24,800
LOCATION: MT
ABSTRACT: This project will establish a year-round renewable demonstration center for the New Western Energy Show. A few of the major goals that this center hopes to accomplish are: (1) maintain and update the New Western Energy Show's exhibits, devices and informational displays; (2) conduct practical, hands-on workshops in the various areas of renewable energy; (3) organize conferences for various energy organizations concerning energy conservation, renewable energy, and appropriate technology; (4) continue to develop and present lectures, slide shows, films and video tapes relating to energy for the general public; and (5) develop energy educational programs for elementary and secondary schools, colleges, universities, senior citizens associations, public service organizations and professional organizations.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWPC-1109
RIP NUMBER: 008063

<1175>
PROJECT TITLE: National access restrictions for key mineral commodities: analysis of case studies
PROJECT NUMBER: WD4.1
DURATION: 01/77-01/78
PRINCIPAL INVESTIGATOR(S): Whitney, J.W.
PHONE: C(702) 323-3050
RESEARCH INSTITUTE: John W. Whitney, Inc., Reno, NV
SPONSOR: Office of Technology Assessment (U.S. Congress), Washington, D.C.
LOCATION: MT;NV
ABSTRACT: The problem is to identify and describe case examples that illustrate the nature of access problems being encountered by individuals, small, and large mining companies, in their efforts to prospect for and develop minerals on federal and nonfederal lands in the United States. An important goal of this analysis is to identify specific access restrictions for nonfuel mineral commodities cited (OSBOM, 1977) as being major from a national viewpoint and moderate from a national viewpoint. Selected interviews and literature search were used to accomplish the analysis. Access problems encountered for five commodities: phosphate, nickel, talc, titanium, and zinc are described. Transportation access was not found to be a major problem, but two important problem areas were identified: (1) delays in mine development resulting from conflict between pressures for preservation of the environment and mine development on federal and nonfederal lands; and (2) federal actions that restrict the ability of the private sector to function as a prospector for and developer of minerals on federal and nonfederal lands. The problems identified are complex, sensitive national issues are involved, and further analysis leading to a clear definition of national minerals policy is needed accompanied with guidelines for implementation by federal agencies. This study is part of Federal Laws, Policies and Practices Affecting Access to Mineral Lands.
REPORTS AND PUBLICATIONS: National Access Restrictions for Key Mineral Commodities: Analysis of Case Studies, limited number of copies on file at Office of Technology Assessment, Washington, DC, Attn: Dr. P.J. Webber.
RECORD NUMBER: OWRC-1217
RIP NUMBER: 009248

<1176>
PROJECT TITLE: Energy research project
PROJECT NUMBER: 1067 0253
DURATION: 10/76-06/78
PRINCIPAL INVESTIGATOR(S): Kimsey, A.P.
PHONE: C(406)365-4722
RESEARCH INSTITUTE: Montana Dept. of Community Affairs, Helena
SPONSOR: Action for Eastern Montana, Glendive, MT
FUNDING: 1977-$16,700; 1978-$33,300
LOCATION: MT
ABSTRACT: The objectives are: (1) assess energy development and transmit discussion material and reports to planning personnel, community officials and citizens of the study area in eastern Montana; (2) arrange field meetings between planners, community personnel and energy company officials for information-education and establishment of communication channels; (3) map coal lease data where requested; (4) prepare uranium resource data for reports and discussions; (5) contact technical and management personnel of energy companies and government agencies to develop data for use by planning and community leaders; (6) offer research assistance to communities involved in planning projects such as rural pipeline water system; (7) combine research on mining, processing facilities, and reclamation with field meetings for benefit of local community planners and governmental personnel; (8) represent communities of the study area at energy and natural resources meetings and prepare findings into discussion material and reports; and (9) compile current energy documents, maps, and associated data for continued use within the local community.
REPORTS AND PUBLICATIONS: Two-volume report on Uranium Resources of the North Plains, Alden P. Kimsey, May 1978, Montana Dept. of Community Affairs and

<1176> CONT.
Action for Eastern Montana; copies deposited at Montana State Library, community libraries in eastern Montana, college research groups, state planning offices, local U.S. Forest Service office, etc.
RECORD NUMBER: OWRC-1227
RIP NUMBER: 0088[illegible]

<1177>
PROJECT TITLE: Assessment of transportation access requirements for minerals exploration and development in Alaska
PROJECT NUMBER: [illegible]
DURATION: 07/77-05/79
PRINCIPAL INVESTIGATOR(S): Wobber, F.J.; Whitney, J.W.; Bryan, D.
PHONE: C(202) 225-[illegible]665
RESEARCH INSTITUTE: Office of Technology Assessment (U.S. Congress), Washington, D.C.
SPONSOR: Office of Technology Assessment (U.S. Congress), Washington, D.C.
FUNDING: 1978-$40,000
LOCATION: AK;MT;ND;WY;CO;NM;AZ
ABSTRACT: Lands to be preserved under the Alaska Native Claims Settlement Act, Sec. 17d2, may create physical or legal barriers to nonfederal (state or native) mineral holdings. Physical access restrictions may exist because of a limited regional transportation network. Legal access restrictions may result from the imposition of federal land management authority over lands placed in wildlife refuges, parks, etc. Report describes several transportation access scenarios and analyzes the effects that federal lands might have on nonfederal mineral resources. Data on nonfederal mineral resources and the transportation systems which support their development are analyzed. This is the first report which presents data on nonfederal minerals access in Alaska and other states (including western).
REPORTS AND PUBLICATIONS: Multiple input reports, subject of effects of federal laws on nonfederal lands not previously studied, limited distribution report available from Materials Program, Attn: F.J. Wobber, Office of Technology Assessment, U.S. Congress, Washington, DC 20510.
RECORD NUMBER: OWRC-1222
RIP NUMBER: 00925[illegible]

<1178>
PROJECT TITLE: Minerals Industry Location System (MILS)--Wyoming
PROJECT NUMBER: State ID 1010397B;SDSM and T 2532
DURATION: 10/77-09/79
PRINCIPAL INVESTIGATOR(S): Lisenbee, A.L.; Kolm, K.
PHONE: C(605)394-2[illegible]53
RESEARCH INSTITUTE: South Dakota School of Mines and Technology, Rapid City. Dept. of Geology and Geological Engineering
SPONSOR: Bureau of Mines, Denver, Colo. ; South Dakota School of Mines and Technology, Rapid City. Dept. of Geology and Geological Engineering
PROJECT MONITOR: Roberts, D. U.S. Bureau of Mines, Building 20, Denver Federal Center, Denver, CO 80220, C(303)234-4421

<1178> CONT.
FUNDING: 1978-$26,300
LOCATION: SD;WY
ABSTRACT: The MILS project seeks to locate all mines, prospects and mineral or rock processing mills in 13 counties of southern Wyoming. The data is placed on computer coding sheets at SDSM and T and placed on computer tape at the U.S. Bureau of Mines, Denver. Printouts of the data and mylar overlays of location maps will then be made available to the public.
RECORD NUMBER: OWRC-1224
RIP NUMBER: 008878

<1179>
PROJECT TITLE: Domestic mining and mineral and mineral fuel conservation fellowships
PROJECT NUMBER: 1110D177
DURATION: 08/77-07/79
PRINCIPAL INVESTIGATOR(S): Redden, J.A.
PHONE: C(605) 394-2493
RESEARCH INSTITUTE: South Dakota School of Mines and Technology, Rapid City
SPONSOR: Department of Health, Education, and Welfare, Washington, D.C.
PROJECT MONITOR: Lindquist, C.B. U.S. Dept. of HEW, Office of Education, Washington, DC 20202
FUNDING: 1978-$70,200
LOCATION: SD
ABSTRACT: The project involves nine graduate fellowships in the areas of mining, metallurgical, and geological engineering to emphasize study and research in the mineral fuels and hydrometallurgy programs.
RECORD NUMBER: OWRC-1228
RIP NUMBER: 009255

ENERGY MANAGEMENT AND POLICY
WASTE HEAT UTILIZATION

<1180>
PROJECT TITLE: Energy park and demonstration devices
DURATION: 10/76-06/77
PRINCIPAL INVESTIGATOR(S): Doran, A.A.
PHONE: C(307)635-9291
RESEARCH INSTITUTE: Community Action of Laramie County, Cheyenne, WY
SPONSOR: Center for Social and Environmental Concerns, Helena, MT
PROJECT MONITOR: Doran, A.A. Community Action of Laramie Co., Bell Building, 1603 Central Ave., Cheyenne, WY 82001
FUNDING: 1977-$1,800
LOCATION: WY
ABSTRACT: This park will provide a functional example of low-cost solar devices that can benefit the average home owner. The object is to provide a track record so that acceptance of alternate energy technology is no longer the exclusive property of ecology buffs. A write-up and slide presentation is being prepared for sharing with interested agencies' use.
RECORD NUMBER: WGC;OWRC-1201
RIP NUMBER: 008874

ENERGY MANAGEMENT AND POLICY
POLICY, LEGISLATION, AND REGULATION
(SEE ALSO 1168, 1173)

<1181>
PROJECT TITLE: Legal and institutional study to promote development of renewable energy
PROJECT NUMBER: RAE 702
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Klinger, R.
RESEARCH INSTITUTE: Richard Klinger, Helena, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$10,000
LOCATION: MT
ABSTRACT: The purpose of the project is to conduct a comprehensive study of existing and potential legal and institutional mechanisms which would stimulate the development and use of renewable energy. The study would include a review, inventory and analysis of existing laws, regulations, ordinances and incentive programs that bear upon aspects of encouraging the development and/or use of renewable energy sources. In addition, the study will include recommended modifications and/or additions to existing laws, regulations, ordinances and incentive programs, and will recommend other legislation which might facilitate increased research, demonstration and utilization of renewable energy resources.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1133
RIP NUMBER: 008088

ENERGY MANAGEMENT AND POLICY

ELECTRIC POWER

(SEE ALSO 1166, 1167)

<1182>
PROJECT TITLE: Utility study
DURATION: 10/76-06/77
PRINCIPAL INVESTIGATOR(S): Duran, A.A.
PHONE: C(307)635-9291
RESEARCH INSTITUTE: Community Action of Laramie County, Cheyenne, WY
SPONSOR: Community Services Administration, Washington, D.C.
PROJECT MONITOR: Duran, A.A. Community Action of Laramie Co., Bell Building, 1603 Central Ave., Cheyenne, WY 82001
FUNDING: 1977-$14,200
LOCATION: WY
ABSTRACT: This project is conducting an in-depth search of utility rate structures and various proposed usage-vs.-charges plans in Wyoming to determine the effect any and all increases made under each structure and plan will have on the low and fixed income, elderly and disadvantaged population. It is also submitting to the Wyoming Legislature a recommendation that would give an equitable income to utility suppliers while protecting the utility users against being unfairly charged for usage.
RECORD NUMBER: NGC;OWRC-1202
RIP NUMBER: 00B872

<1183>
PROJECT TITLE: Generic rate study
DURATION: 10/76-06/77
PRINCIPAL INVESTIGATOR(S): Duran, A.A.
PHONE: C(307)635-9291
RESEARCH INSTITUTE: Community Action of Laramie County, Cheyenne, WY
SPONSOR: Community Services Administration, Washington, D.C.
PROJECT MONITOR: Duran, A.A. Community Action of Laramie Co., Bell Building, 1603 Central Ave., Cheyenne, WY 82001
FUNDING: 1977-$18,500
LOCATION: WY
ABSTRACT: The study will endeavor to conduct a thorough research of utility rate structures. Determination of the effect of further increases on the lives of the elderly, fixed and low income, and the disadvantaged will be made on the basis of the research. A protective and/or corrective course of action for those severely affected by an inequitable rate structure will be recommended to the Legislature following completion of this study.
RECORD NUMBER: NGC;OWRC-1203
RIP NUMBER: 00B873

<1184>
PROJECT TITLE: Alternative scenario: electrical energy future for the Pacific Northwest
DURATION: 06/76-02/78
PRINCIPAL INVESTIGATOR(S): Beers, R.; Lash, T.
PHONE: C(415)327-1080
RESEARCH INSTITUTE: Natural Resources Defense Council, Inc., Palo Alto, Calif.
SPONSOR: Natural Resources Defense Council, Inc., Palo Alto, Calif. ; Energy Research and Development Administration, Washington, D.C.. Office of Planning, Analysis, and Evaluation; Sierra Club, San Francisco, Calif.. National Water Resources Committee; Oregon Environmental Foundation ; Northwest Fund for the Environment
FUNDING: 1976-$10,000; 1977-$7,000; 1978-$30,000
LOCATION: MT;WY;WA;ID;OR
ABSTRACT: The purpose of this study is to stimulate further dialogue and planning concerning the Pacific Northwest's future needs for electrical energy and the optimum means of meeting those needs. Until recently, almost 90% of the region's electricity was provided from hydroelectric facilities. With the decline in the potential for additional hydroelectric generation, the region's utilities, the Bonneville Power Administration (BPA) and its industrial customers have developed plans which call for greatly increased reliance on large thermal power plants for the region. More recently, others have argued that these plans seriously overstate the need for additional generation of electricity and that substantial savings could be achieved by encouraging more efficient use of electricity, while investigating alternative, cleaner energy technologies. This study attempts to investigate alternative energy scenarios for the Pacific Northwest.
REPORTS AND PUBLICATIONS: Choosing an Electrical Energy Future for the Pacific Northwest: An Alternate Scenario--Final Draft, Roger Beers, Terry R. Lash (Natural Resources Defense Council, Inc., 2345 Yale Street, Palo Alto, CA 94306), January 31, 1977.
RECORD NUMBER: OWRC-1172
RIP NUMBER: 00B719

ENERGY MANAGEMENT AND POLICY
UNCONVENTIONAL SOURCES AND POWER GENERATION
(SEE ALSO 1181)

<1185>
PROJECT TITLE: Development of an alternative energy testing laboratory
PROJECT NUMBER: RAE 113
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Reihman, T.
PHONE: C(406)994-2203
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Mechanical Engineering
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$12,000
LOCATION: MT
ABSTRACT: The Mechanical Engineering Department wishes to establish an Energy Testing Laboratory that would test and evaluate available renewable energy equipment for use in Montana. Of primary importance would be the distribution of the information obtained from the Energy Testing Laboratory. Equipment would be transported to Montana State University where it would be tested. The ultimate goal of this program is the development of information useful to the people of Montana in deciding whether a particular alternate energy system is practical and in deciding which component works best in Montana.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Montana Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1134
RIP NUMBER: 008089

<1186>
PROJECT TITLE: Assessment of environmental, safety and social impacts of MHD technology
DURATION: 06/77-11/77
PRINCIPAL INVESTIGATOR(S): Rogers, S.J.
PHONE: C(406)994-4123
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Chemistry
SPONSOR: Montana Energy and MHD Research and Development Inst., Inc., Butte
FUNDING: 1977-$30,000
LOCATION: MT
ABSTRACT: The objective of this study was to organize the technical resource necessary to identify, accumulate and interpret all existing information relative to quantitatively assessing health, safety, environmental and social consequences of MHD technology using a range of available environmental control technologies. Such assessment will provide best estimates of consequences and specification of the range and source of uncertainties. This project is a subcontract.
REPORTS AND PUBLICATIONS: (1) First Draft, Environmental Development Plan, MHD Program; (2) Draft Interim Report, Environmental Development Plan, as modified by MSU, 8/24/77; (3) Final Draft, Environmental Development Plan, 9/77; (4) Review and Assessments of Potential Impacts of MHD Technology, October 15, 1977, prepared for ERDA under Contract No. EF-77-C-01-2524, under subcontract No. 77-006.
RECORD NUMBER: OWRC-1169
RIP NUMBER: 007967

MATERIALS, COMPONENTS, AND AUXILIARIES

<1187>
PROJECT TITLE: Fuel cell materials--electrical properties
PROJECT NUMBER: G and C 333
DURATION: 12/76-continuing
PRINCIPAL INVESTIGATOR(S): Schmidt, V.H.; Snyder, S.
PHONE: C(406)994-3614
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Physics
SPONSOR: Montana Energy and MHD Research and Development Inst., Inc., Butte
FUNDING: 1977-$0,500
LOCATION: MT
ABSTRACT: Study LaCrO3-based ceramic electrodes to determine electrical conductivity, Hall mobility, etc., to determine nature of carriers. Eventually study effects of hydrogen diffusion on properties of this and other ceramics. This project is a subcontract.
RECORD NUMBER: OWRC-1168
RIP NUMBER: 007966

ELECTROCHEMISTRY, MASS TRANSFER, AND THERMODYNAMICS

<1188>
PROJECT TITLE: Thermodynamic analysis of high temperature materials of importance to molten carbonate fuel cells
PROJECT NUMBER: G and C 340
DURATION: 04/78-09/78
PRINCIPAL INVESTIGATOR(S): Eliazer, I.; Howald, R.A.; Verwolf, M.C.
PHONE: C(406)994-4801
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Chemistry
SPONSOR: Montana Energy and MHD Research and Development Inst., Inc., Butte
FUNDING: 1978-$19,500
LOCATION: MT
ABSTRACT: High temperature molten carbonate fuel cells offer considerable promise for the efficient clean production of electrical power. The problems which need to be solved involve the thermodynamic properties of the molten carbonate electrolyte. We propose to apply the analysis of the thermodynamic properties of molten carbonate systems. This project is a subcontract.
RECORD NUMBER: OWRC-1167
RIP NUMBER: 007965

<1189>
PROJECT TITLE: Upper Missouri River Basin Level B study
DURATION: 11/77-05/80
PRINCIPAL INVESTIGATOR(S): Waddington, M.
PHONE: C(406)449-5497
RESEARCH INSTITUTE: Missouri River Basin Commission, Helena, Mont.
SPONSOR: Water Resources Council, Washington, D.C.
FUNDING: 1978-$1,000,000
LOCATION: MT
ABSTRACT: The overall objective of this study is to recommend action plans and programs which will provide guidelines for the management of the Upper Missouri Basin's land and water resources. The plan to be prepared is a Level B which is regional or basin-wide in scope. Level B plans are prepared to resolve critical near-term (next 15 years) and mid-term (15 to 25 years) issues and problems. Some of the specific objectives identified are: (1) identify municipal and rural water requirements; (2) project possible levels of future agricultural production; (3) determine requirements of stream-dependent ecosystems; (4) project possible levels of future energy production; (5) identify opportunities for satisfying water-related outdoor recreation demands; (6) determine measures for maintaining or meeting, and enforcing water quality standards; (7) determine measures for minimizing the impacts of flooding; (8) estimate unappropriated water availability; (9) evaluate federal and state water-related programs and projects; and (10) assure that all recommendations can be implemented. Hydropower projects, in certain cases, possess water rights and may preclude additional depletions. Evaluation of alternative energy sources such as solar or geothermal should be considered. A greater demand for coal reserves in the basin may arise, especially if development occurs in the adjacent Yellowstone Basin. This will also result in the use of water for cooling any thermal plants which may be developed. Consideration will also be given to the possible social and environmental effects associated with development of these reserves.
RECORD NUMBER: OWRC-1145
BIP NUMBER: 008125

<1190>
PROJECT TITLE: Evaluation and implementation of redevelopment alternatives for Valley Industrial Park, Montana
PROJECT NUMBER: C-77-02
DURATION: 07/77-06/78
PRINCIPAL INVESTIGATOR(S): Kissner, J.A.; Hodge, J.B; Brown, S.J.; Engellant, D.; Podobnik, J.
RESEARCH INSTITUTE: Montana International Trade Commission, Butte
COOPERATOR: Montana Energy and MHD Research and Development Institute, Box 3809, Butte, MT 59701
SPONSOR: Economic Development Administration, Washington, D.C.
FUNDING: 1978-$247,000
LOCATION: MT
ABSTRACT: The study addresses six (6) articulated potential development areas: (1) Farm Implement Manufacturing; (2) Solar Component Manufacturing; (3) Wind Component Manufacturing; (4) Railcar Manufacturing; (5) Residential Furnace Manufacturing; and (6) Energy-Related Development Strategy. The contractor is committed to approach each area utilizing a combination of resources. The objective of the study is to respond to defined goals, of Valley Industrial Park, Inc., the State of Montana, and the Federal level culminating in projects which will contribute to the timely economic reuse of the former Strategic Air Command base at Glasgow, Montana. (MEO)
RECORD NUMBER: OWRC-1143
BIP NUMBER: 008123

<1191>
PROJECT TITLE: Financial strategies for alleviation of socioeconomic impacts in seven western states
PROJECT NUMBER: CR-05-60803-00
DURATION: 06/75-05/77
PRINCIPAL INVESTIGATOR(S): Bronder, L.; Carlisle, N.; Savage, M.
PHONE: C(303)837-5851
RESEARCH INSTITUTE: Western Governors Regional Energy Policy Office, Denver, Colo.
SPONSOR: Old West Regional Commission, Washington, D.C. ; Four Corners Regional Commission ; Federal Energy Administration, Washington, D.C.
LOCATION: AZ;CO;MT;NM;ND;UT;WY
ABSTRACT: This study addressed the problems of small communities in seven western states which have been or in the future may be impacted by large and rapid population increases due to energy development. This study concentrates on energy-related socioeconomic impacts. State, county, municipal and school district sources of revenue and patterns of spending are analyzed for each state in the study. The study included an analysis of the housing problem which occurs when there is a rapid influx of new population into a small community with no surplus of existing housing and a lack of private and public financial resources for construction which normally are found in metropolitan areas. Statistical projections are made of the number of housing units likely to be needed in each community in the next decade. Estimates are made as to the ability of workers to rent apartments or to buy homes or mobile homes, with a finding that many workers will not be able to afford any of these. The study included an overview of possible financial strategies which may have general application in Rocky Mountain and Great Plains states where energy development poses a threat of serious socioeconomic impacts.
REPORTS AND PUBLICATIONS: Financial Strategies for Alleviation of Socioeconomic Impacts in Seven Western States, May 1977, prepared by Leonard D. Bronder, Nancy Carlisle, and Michael D. Savage for the Western Governors' Regional Energy Policy Office under a cost-sharing agreement with the Federal Energy Administration (inquire at Western Interstate Energy Board, 2500 Stapleton Plaza, 3333 Quebec, Denver, CO 80207, for availability).
RECORD NUMBER: OWRC-1137
BIP NUMBER: 008119

<1192>
PROJECT TITLE: Small-scale hydroelectric energy supply system
PROJECT NUMBER: RAE 603
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Savage, T.
PHONE: C(406)273-6610
RESEARCH INSTITUTE: Terry Savage, Lolo, MT
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$14,000
LOCATION: MT
ABSTRACT: This project will demonstrate a small-scale 12 kw hydroelectric energy supply system to be used to supply, on a continuous basis, 100 percent of the energy requirements for a modern 2,000 sq. ft. all-electric subterranean home located 7 miles southwest of Superior.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1115
RIP NUMBER: 008074

SCHOOL

<1193>
PROJECT TITLE: Energy conservation program for state buildings in Montana
DURATION: 11/77-11/78
PRINCIPAL INVESTIGATOR(S): Drapes, A.
PHONE: C(406)452-9558
RESEARCH INSTITUTE: Drapes Engineering Firm, Great Falls, Mont.
SPONSOR: Montana State Government, Helena
FUNDING: 1978-$200,000
LOCATION: MT
ABSTRACT: GOAL: To reduce energy consumption in, and life cycle costs of, existing state-owned buildings. PROGRAM: (A) Gather energy consumption data; (B) Establish priorities and program cash flow; (C) Conduct energy audit of metered buildings and select buildings to be surveyed on a life cycle analysis; (D) Conduct life cycle cost analysis of buildings selected to be surveyed; (E) Submit capital project request to legislature for retrofit construction and continuation of meter installation, and life cycle cost surveys; (F) Monitor results of energy conservation program. (BEO)
RECORD NUMBER: OWRC-1161
RIP NUMBER: 007960

SCHOOL
(CONTINUED)

<1194>
PROJECT TITLE: Wood heated underground structure
PROJECT NUMBER: RAE 064
DURATION: 01/78-01/79
PRINCIPAL INVESTIGATOR(S): Badgley, J.
PHONE: C(406)728-5352
RESEARCH INSTITUTE: Institute of the Rockies, Missoula, Mont.
SPONSOR: Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div.
FUNDING: 1978-$3,700
LOCATION: MT
ABSTRACT: This project will compile information that is currently available on the state-of-the-art of underground building. It will also study the feasibility of an underground, wood-heated conference center near Missoula. If this project appears to be feasible, a final design will be prepared. This project can make a contribution towards meeting future energy needs by showing: (1) the cost effectiveness of sub-terranean architecture: (2) the potential for energy savings in underground structures; (3) the potential for passive solar space heating in underground structures; (4) the potential for integrating the storage systems for two new renewable energy sources (passive solar and wood); and (5) the desirability of the environment created through sub-terranean architecture.
REPORTS AND PUBLICATIONS: Quarterly and Final Reports will be submitted to the Energy Planning Div., Mt. Dept. of Natural Resources and Conservation, Helena, MT 59601.
RECORD NUMBER: OWRC-1120
RIP NUMBER: 008065

LAND AND ROADWAY

<1195>
PROJECT TITLE: Highway relocation policy and procedures to accommodate energy development
DURATION: 01/77-01/78
PRINCIPAL INVESTIGATOR(S): King, W.P.; Bastron, A.P.
PHONE: C(307)777-7544
RESEARCH INSTITUTE: Wyoming State Highway Dept., Cheyenne, WY
SPONSOR: Wyoming State Government, Cheyenne
FUNDING: 1977-$35,000
LOCATION: WY
ABSTRACT: This project will develop a State Highway Department policy and implementing procedures to cope with the following problem. Coal lease boundaries are established on a pattern that utilizes land division lines, and do not recognize surface facilities. The leases or portions thereof are often exchanged between various energy companies, and only by coincidence do exchanges follow surface ownership boundaries. In developing mining plans, the companies find the roads in their present locations severely hamper efficient mining operations, and request that the roads be relocated. Relocations for a single operator are not a significant problem. However, the problem becomes very complex when several operators are in the area, and the cumulative effect of all the proposed relocations is a poorly designed road that is longer, out of direction, more costly to maintain, subject to constant change, and ultimately denies the roaduser the type of facility he is entitled to and for which he has paid.
RECORD NUMBER: NGC;OWRC-1204
RIP NUMBER: 008876

CONSERVATION SERVICES

<1196>
PROJECT TITLE: Statewide goals, policies and guidelines for local land use planning
DURATION: 02/76-06/76
PRINCIPAL INVESTIGATOR(S): Ahl, J.G.
PHONE: C(307)777-7493
RESEARCH INSTITUTE: Wyoming State Land Use Commission, Cheyenne
SPONSOR: Wyoming State Government, Cheyenne ; Department of Housing and Urban Development, Washington, D.C.
FUNDING: 1976-$2,600
LOCATION: WY
ABSTRACT: Local governments should consider energy conservation as a factor in the designation of land for specified uses. Suggested guidelines: (1) encourage new development to locate in existing urban areas; (2) minimize travel distances between residences, public facilities, jobs, recreational and shopping areas; (3) consider energy conservation when planning the location of public facilities and services; (4) encourage the multiple and mixed use of facilities for uses that are compatible; (5) encourage cluster developments; (6) encourage vehicular routes that minimize stop-start occurrences; (7) encourage the use of renewable sources of energy, such as water, sun, wind, geothermal heat and municipal waste, through local plans and implementation proposals; and (8) encourage the development of public transportation systems.
RECORD NUMBER: NGC;OWRC-1206
RIP NUMBER: 009236

ENVIRONMENTAL SCIENCES, ATMOSPHERIC
CHEMICALS MONITORING AND TRANSPORT

<1197>
PROJECT TITLE: Wood burning and particulate air pollution in the Missoula Valley
DURATION: 06/77-09/77
PRINCIPAL INVESTIGATOR(S): Samel, R.G.; Otis, T.
PHONE: C(406) 728-4515
RESEARCH INSTITUTE: Missoula City-County Health Dept., Air Pollution Control Div., Missoula, MT
SPONSOR: Missoula City-County Health Dept.
FUNDING: 1977-$1,300
LOCATION: MT
ABSTRACT: The current energy crisis has caused a recent conscious effort on the part of Missoula area households to shift from fossil fuel space heating to a renewable based source--wood. The result is a steady growth in the amount of wood burned in the valley, and therefore a steady growth in particulate emissions. In order to determine the amount of these emissions, the Missoula City-County Health Department has conducted a wood-burning inventory. Currently, 22% of the particulate content in the wintertime inversion ambient air is due to woodburning households. This study further projects that that proportion will increase to 42% by 1985. This information indicates that further research into the effect of wood-burning particulate upon the ambient air and upon human health is needed. Further, it will be necessary for the community to reach some acceptable solutions to the paradox of diminishing energy resources resulting in diminished air quality.
REPORTS AND PUBLICATIONS: Wood Burning and Particulate Air Pollution in the Missoula Valley, Final Report prepared for the Missoula City-County Health Dept., Air Pollution Control Division, prepared by Ted Otis, principal researcher, James B. Carlson, R.G. Samel, and Gerald Caton, contributors, copies available from the Missoula City-County Health Dept.
RECORD NUMBER: OWRC-1147
BIP NUMBER: 008127

ENVIRONMENTAL SCIENCES, TERRESTRIAL
BASIC STUDIES
(SEE ALSO 1204, 1217)

<1198>
PROJECT TITLE: LANDSAT digital data classification
PROJECT NUMBER: WELUT No. 004-2-76
DURATION: 09/76-12/77
PRINCIPAL INVESTIGATOR(S): Rogers, R.H.
RESEARCH INSTITUTE: Bendix Aerospace Systems Div., Ann Arbor, Mich.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Parker, D. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303) 241-2040, F323-5287
FUNDING: 1977-$129,500
LOCATION: SD;WY;CO;UT;NM
ABSTRACT: This study will obtain and process LANDSAT digital data by computer to produce vegetation and land-use surface feature classifications according to a classification system to be supplied by FWS on the five Regional Environmental Test Sites. Error analysis and quantitative evaluation will be conducted on classification accuracy, geographic accuracy, and areal measurement precision on all areas classified.
REPORTS AND PUBLICATIONS: (1) A manual explaining the methods, applicability, advantages, and disadvantages, and limitations of LANDSAT digital data relative to fish and wildlife habitat evaluations; (2) Computer written, color-coded maps for all the land area within each Regional Environmental Test Area at a scale of 1:250,000; (3) Error Analysis, specific to surface feature classes examined, yielding error estimate from which the utility of LANDSAT data for particular wildlife-related application can be assessed.
RECORD NUMBER: OWRC-1104
BIP NUMBER: 007647

<1199>
PROJECT TITLE: Western Energy and Land Use Team (WELUT)
DURATION: 09/75-continuing
PRINCIPAL INVESTIGATOR(S): McGowan, T.
PHONE: C(303) 221-2040;F323-5287
RESEARCH INSTITUTE: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
SPONSOR: Fish and Wildlife Service, Washington, D.C.. Office of Biological Services
PROJECT MONITOR: Stewart, R. Coal Project Leader, USF and WS, Dept. of Interior, Washington, DC 20240
FUNDING: 1977-$1,000,000
LOCATION: MT;WY;CO;ND;UT;NM
ABSTRACT: The Western Energy and Land Use Team (WELUT) is part of the Biological Services Program of the United States Fish and Wildlife Service (FWS). The basic mission of the Biological Services Program and WELUT is to strengthen the ecological basis for renewable resource management, land-use decisions, and the formulation of environmental regulations. The specific responsibility of WELUT is to provide information that will enhance consideration of fish and wildlife in decisionmaking processes. Efforts of the Team are focused on ecosystems likely to be stressed by energy

<1199> CONT.
developments and other land-use changes. Currently the Team has studies and other activities directed towards problems associated with development of coal, oil shale, and geothermal resources and the allocation of water for these and other purposes. Other resource development areas will be addressed as needs arise.
REPORTS AND PUBLICATIONS: Contact the Information Transfer Specialist, WELUT, Office of Biological Services, USDI, U.S. Fish and Wildlife Service, Drake Creekside Bldg., 2625 Redwing Road, Fort Collins, CO 80521, for a list of available publications.
RECORD NUMBER: OWRC-1098
RIP NUMBER: 007644

<1200>
PROJECT TITLE: Geochemical survey of vegetation in the western energy regions
DURATION: 07/74-1979
PRINCIPAL INVESTIGATOR(S): Erdman, J.A.
PHONE: C(303) 234-5240
RESEARCH INSTITUTE: Geological Survey, Denver, Colo.. Geologic Div.
SPONSOR: Geological Survey, Denver, Colo.. Geologic Div.
LOCATION: MT;ND;WY;UT;NM:AZ
ABSTRACT: The principal objective of the project is to make a reconnaissance geochemical survey of the area of energy resources in the Rocky Mountain region and the Northern Great Plains. The survey will emphasize the geochemistry of the vegetation--both native (principally big sagebrush) and field crops (hard red wheat)--and to a limited degree the associated soils which occur in this area. Initial studies of the program have attempted to quantify geochemical differences among or within the major energy regions of the West, and will provide baseline data which can be used to monitor possible future changes in the geochemical environment due to energy, in particular coal development. Adjunct studies of coal-spoil reclamation and rehabilitation areas are being conducted to assess possible alterations in the local trace element environments. This is a sub-project of A Geochemical Survey of the Western Coal Regions.
REPORTS AND PUBLICATIONS: (1) James A. Erdman and Larry P. Gough, Variation in the Element Content of Parmelia Chlorochroa from the Powder River Basin of Wyoming and Montana, in The Bryologist, Vol. 80, No. 2, Summer 1977; (2) J.A. Erdman, L.P. Gough and R.W. White, Calcium Oxalate as Source of High Ash Yields in the Terricolous Lichen Parmelia Chlorochroa, in The Bryologist, Vol. 80, No. 2, Summer 1977.
RECORD NUMBER: OWRC-1191
RIP NUMBER: 008728

<1201>
PROJECT TITLE: Off road vehicle impact on grasslands of the Ashland Divison, Custer National Forest
PROJECT NUMBER: G and C 756
DURATION: 07/77-10/77
PRINCIPAL INVESTIGATOR(S): Payne, G.F.
PHONE: C(406) 994-3721
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Dept. of Animal and Range Sciences
SPONSOR: Forest Service, Billings, Mont.. Custer National Forest
FUNDING: 1977-$4,200
LOCATION: MT
ABSTRACT: As southeastern Montana energy development progresses, there will be increased pressures on federal and state lands for recreational use. This project investigates the impact of off-road vehicles on a grassland on the Ashland Division, Custer National Forest. The impacts were applied at monthly intervals May through September, 1976. Soil and vegetation responses were evaluated in 1976 and will continue in 1977.
RECORD NUMBER: OWRC-1157
RIP NUMBER: 008116

<1202>
PROJECT TITLE: Ecological energetics and relationships in a mixed-grass ecosystem
PROJECT NUMBER: WELUT No. 046-75
DURATION: 05/75-12/79
PRINCIPAL INVESTIGATOR(S): Schitoskey, F.
PHONE: C(605) 688-6121
RESEARCH INSTITUTE: South Dakota Cooperative Wildlife Research Unit, Brookings
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Streeter, R. USF and WS, WELUT, Drake Creekside Bldg., 2625 Redwing Rd., Ft. Collins, CO 80521
FUNDING: 1976-$43,700; 1977-$43,700; 1978-$43,700
LOCATION: WY;SD
ABSTRACT: The study will use an ecosystem approach to determine those populations of terrestrial vertebrate species that appear to be most sensitive to projected changes in the environment and test a related model as a predictive technique. Seasonal vegetation composition and net production will be determined, a list of terrestrial vertebrates on study areas will be developed, and abundance of permanent and seasonal residents will be determined. Detailed ecological studies will be conducted on populations of species that appear to be most sensitive to projected changes in the environment.
REPORTS AND PUBLICATIONS: (1) Major technical papers that will result from this study include: (a) The Ecology of the Ferruginous Hawk, (b) The Ecology of the Porcupine, (c) Habitat Selection of Selected Vertebrates; (2) An integration systems model capable of simulating the potential impacts of energy development on net primary production and on terrestrial vertebrate

ENVIRONMENTAL SCIENCES, TERRESTRIAL
BASIC STUDIES

<1202> CONT.
population in a mixed-grass ecosystem; (3) Basic inventory data will include (a) vegetative analysis map and data, (b) faunal inventory (annual), and (c) primary production.
RECORD NUMBER: OWRC-1107
RIP NUMBER: 007603

ENVIRONMENTAL SCIENCES, TERRESTRIAL
SITE RESOURCE AND USE STUDIES
(SEE ALSO 1087, 1088, 1093, 1094, 1130, 1198, 1199, 1200, 1202, 1219)

<1203>
PROJECT TITLE: Techniques for planting shrubs and trees on uranium spoils
PROJECT NUMBER: C1c4 RC4
DURATION: 09/77-12/80
PRINCIPAL INVESTIGATOR(S): Uresh, D.; Yamamoto, T.
RESEARCH INSTITUTE: Forest Service, Rapid City, S.Dak.. Rocky Mountain Forest and Range Experiment Station
SPONSOR: Forest Service, Billings, Mont.. Surface Environment and Mining; Forest Service, Billings, Mont.. Custer National Forest; Forest Service, Rapid City, S.Dak.. Rocky Mountain Forest and Range Experiment Station
LOCATION: SD
ABSTRACT: Open surface pit mining for uranium leaves a spoil that is environmentally harsh and slowly reclaimed by plants. The objective is to evaluate site ameliorations to improve the environment for reestablishment of shrubs and trees. Two recommended shrubs--rubber rabbitbrush and four wing salt bush--and one tree--western juniper--were fall and spring planted in clumps, 10 plants per clump, in hand prepared depressions. Preplanting site preparation included gypsum and leonardite and postplanting includes wood chips and root treatment. Spoil physical and chemical analysis pre- and post-treatment were included in the study.
RECORD NUMBER: OWRC-1220
RIP NUMBER: 009251

<1204>
PROJECT TITLE: Evaluation of CIR imagery analysis techniques
PROJECT NUMBER: WELUT No. 004.3-76
DURATION: 09/76-03/78
PRINCIPAL INVESTIGATOR(S): Sparks, J.
RESEARCH INSTITUTE: RRB Singer, Inc. State College, Pa.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Parker, D. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, F323-5287
FUNDING: 1977-$122,500; 1978-$122,500
LOCATION: MT;WY
ABSTRACT: This study will evaluate and compare manual and machine-aided analog and digital processing of CIR imagery for extracting detailed ecological and land-use information. Tests will be conducted to determine the capability of medium-scale CIR imagery to delineate the distribution of and inventory the amount of land in certain ecological and land-use classes. The capability of large-scale CIR imagery to provide quantitative estimates of species composition, frequency, and density of vegetation will also be investigated. The study will provide estimates of unit cost, time requirements, and accuracy for each of the tested methods.
REPORTS AND PUBLICATIONS: (1) Maps illustrating vegetation subclass and land-use classes and subclasses, and the accuracy associated with each; (2) Operationally oriented report documenting the methods, approach, unit cost estimates, time requirements, accuracy estimates, advantages and

<1204> CONT.
disadvantages of manual and machine-aided analog and digital processing of CIR imagery. Copies are now available from R.R.B. Singer, Inc. Technical Literature Review, May 1977 (WELUT-77/10), available from Project Officer, Denny Parker, US FWS, WELUT, Drake Creekside Bldg., 2625 Redwing Rd., Fort Collins, CO 80521.
RECORD NUMBER: OWRC-1105
BIP NUMBER: 007646

<1205>
PROJECT TITLE: Development of a methodology for establishing siting criteria for the State of Montana
DURATION: 04/78-04/80
PRINCIPAL INVESTIGATOR(S): Dayton, I.E.
PHONE: C(406)449-3024
RESEARCH INSTITUTE: Montana Commission of Higher Education, Helena
COOPERATOR: Montana Office of Lieutenant Governor, Capitol Station, Helena, MT 59601
SPONSOR: Ford Foundation Energy Policy Project, Washington, D.C.
FUNDING: 1978-$13,300
LOCATION: MT
ABSTRACT: The proposed program is designed to facilitate an effective and continuing framework for problem solving between Montana state government and the Montana University System in the development and evaluation of state resource and environmental policy. The program has two major objectives: (1) to make available to state agencies the resources of the University System in the long-term planning and the development of policy options; and (2) to provide immediate faculty assistance to state agencies on a short-term basis in the resolution of current policy problems. The product will be the development of a methodology for the State of Montana for establishing siting criteria for energy and other major industrial activities. Specifically, the project will concern itself with (1) an analysis of the statutory authority and regulatory framework that affect Montana siting decisions; (2) a review of other states' attempts to develop and apply siting criteria; (3) the development of a methodology for forecasting Montana's energy needs; (4) the development of recommendations for inventorying the state's resources; (5) an evaluation of available public participation programs for development and applying siting criteria; and (6) the development of a methodology for weighting the importance of individual siting criteria.
RECORD NUMBER: OWRC-1158
BIP NUMBER: 008112

<1206>
PROJECT TITLE: Flexible cultural practices for establishment of perennial and annual vegetation on topsoiled stripmines
PROJECT NUMBER: G and C 741
DURATION: 08/77-12/79
PRINCIPAL INVESTIGATOR(S): Burris, M.J.: Wiesner, L.: Krall, J.
PHONE: C(406)994-3681
RESEARCH INSTITUTE: Montana State Univ., Bozeman. Agricultural Experiment Station
SPONSOR: Montana State Univ., Bozeman. Agricultural Experiment Station; Cooperative State Research Service, Washington, D.C.
FUNDING: 1978-$32,500
LOCATION: MT
ABSTRACT: Objectives are: (1) to assess the capabilities of several annual and perennial crop species to function as barriers for the trapping and retention of winter snowfall; (2) to determine if snow retention increases seedling establishment and subsequent growth of a forage mixture, if increased snow retention on a site affects maturity of the seed crop and to monitor species composition changes associated with increased snow cover, increased soil moisture and reduced winter exposure on barrier vs. nonbarrier sites; (3) utilizing annual nurse crops, stubble seeding techniques and frost seeding techniques, to determine their impact on the success of perennial forage seedlings on spoils materials; (4) growing a green manure crop on stockpiled topsoil to determine if a significant decrease in weed seed and increase in nitrogen content can be made over uncropped stockpiled topsoil. The following approaches will be utilized: (1) several annual and perennial grasses and forbs including wheat, barley, oats, flax, sunflowers, tall wheatgrass, sudangrass, sorghum and others will be planted in strips and will be evaluated for their ability to trap snow; (2) various forage mixtures will be seeded between barriers to evaluate establishment as it relates to moisture levels; (3) several annual crops will be seeded to evaluate establishment of forage species using nurse crops, stubble seeding techniques and frost seeding techniques; and (4) a portion of stockpiled topsoil will be seeded with several green manure crops. (MPO)
RECORD NUMBER: OWRC-1158
BIP NUMBER: 008117

<1207>
PROJECT TITLE: Selection and increase of perennial forbs for mine spoil reclamation in the Northern Great Plains
PROJECT NUMBER: C1d1
DURATION: 11/76-12/78
PRINCIPAL INVESTIGATOR(S): Whitman, W.C.
RESEARCH INSTITUTE: North Dakota State Univ., Fargo. Dept. of Botany
COOPERATOR: American Indianhead Mine
SPONSOR: Forest Service, Billings, Mont.. Surface Environment and Mining: Forest Service, Fort Collins, Colo.. Rocky Mountain Forest and Range Experiment Station
PROJECT MONITOR: Bjudstad, A. USFS, Rocky Mountain Forest and Range Experiment

<1207> CONT.
Station, South Dakota School of Mines and Technology, Rapid City, SD
LOCATION: ND
ABSTRACT: Some attention is being given in North Dakota to the restoration of mined land to a cover of native grasses, but little or no concern has been given to the restoration of the forb component of the ecosystem. Sources of forb seeds or forb plant material for use on mine spoils is very limited or even non-existent. The problems of the development of planting methods and site conditions conducive to the establishment of forbs on mine spoils have not been investigated in this area. The immediate and specific aspects of the problem with which this study is concerned are thus the collection of seeds of native forbs which may have usefulness in the reclamation of mined lands, the determination of the germinability, viability, and storage and pre-planting treatments needed for the predetermined selection of forbs and the determination of the adaptability of the various forb species using container and seeded plants to existing spoils. Seed will be collected from 25 or more forbs growing in the native mixed grass prairie region of southwestern North Dakota. Viability will be determined using the pinch and tetrazolium tests. Germination tests of all species will be made monthly on triplicate lots of 50 seeds each. Seeds of the different species will be planted in containers in the greenhouse in February for field planting in May when the containerized forb seedlings will be planted in coal mine spoils. Direct seeding of forb species will also then be done. Survival, establishment, and growth measurements will run two growing seasons.
RECORD NUMBER: OWRC-1219
RIP NUMBER: 009250

<1208>
PROJECT TITLE: Environmental impact analysis of Coyote Station near Beulah, ND
PROJECT NUMBER: C-15380
DURATION: 04/75-08/76
PRINCIPAL INVESTIGATOR(S): Wells, E.A.; Fifield, L.; Packnett, D.; McCann, E.
PHONE: C(303)758-1122
RESEARCH INSTITUTE: Stearns-Roger Engineering Co., Denver, Colo.
SPONSOR: Otter Tail Power Co., Fergus Falls, Minn.
LOCATION: ND
ABSTRACT: This project concerns limnological, meteorological, air quality, terrestrial, archaeological, and socioeconomic baseline data and considerations for a proposed coal-fired steam generator power plant near Beulah, ND.
REPORTS AND PUBLICATIONS: Environmental Impact Analysis of Coyote Station near Beulah, North Dakota.
RECORD NUMBER: OWRC-1210
RIP NUMBER: 009241

<1209>
PROJECT TITLE: Analysis of physical and biological environment for Basin Electric Power Cooperative's Antelope Valley Station near Beulah, ND
PROJECT NUMBER: C-17554
DURATION: 05/76-06/77
PRINCIPAL INVESTIGATOR(S): Wells, E.A.; McCann, E.; Hostetter, T.; Preston, D.; Packnett, D.
PHONE: C(303)758-1122
RESEARCH INSTITUTE: Stearns-Roger Engineering Co., Denver, Colo.
SPONSOR: Basin Electric Power Cooperative, Bismarck, N.Dak.
LOCATION: ND
ABSTRACT: Geologic, hydrologic, aquatic, wildlife, vegetation, soils, air quality, and meterological baseline data related to a proposed coal-fired steam generating plant were collected and discussed in detail.
REPORTS AND PUBLICATIONS: Analysis of Physical and Biological Environment of the Antelope Valley Station near Beulah, North Dakota.
RECORD NUMBER: OWRC-1209
RIP NUMBER: 009240

<1210>
PROJECT TITLE: Status of land use changes affecting habitats in Wyoming
PROJECT NUMBER: WELUT No. 132-78
DURATION: 11/77-11/78
PRINCIPAL INVESTIGATOR(S): Crowe, D.
PHONE: C(307)771-7461
RESEARCH INSTITUTE: Wyoming Dept. of Game and Fish, Cheyenne
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: King, H. OSP and WS, WELUT, Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521
FUNDING: 1978-$26,000
LOCATION: WY
ABSTRACT: A current status of habitat changes that affect fish and wildlife does not exist in the western states. Before an analysis of the effects and impacts of coal development can be completed, one needs to know in a quantitative sense, the rates of loss of each habitat type and the relative causes of those losses. This project is of major interest to the State of Wyoming Game and Fish Department for their planning purposes. It will be used as a prototype for other areas in the West for data collection, indexing, updating, and application systems methodologies.
REPORTS AND PUBLICATIONS: (1) The final products will be in narrative form with map based and tabular quantitative supportive material. Specific formats will be developed jointly with the Project Officer; (2) Interim products include lists of data sources, proposed data indexing system, proposed system for updating information, and the basic data itself.
RECORD NUMBER: OWRC-1108
RIP NUMBER: 007641

ENVIRONMENTAL SCIENCES, AQUATIC
BASIC STUDIES
(SEE ALSO 1099, 1199, 1218)

<1211>
PROJECT TITLE: Aquatic endangered species
PROJECT NUMBER: WELUT No. 024-76
DURATION: 01/77-08/77
PRINCIPAL INVESTIGATOR(S): Joseph, T.
RESEARCH INSTITUTE: Ecology Consultants, Inc., Fort Collins, Colo.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Doerksen, H. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, F323-5287
FUNDING: 1977-$75,000
LOCATION: MT;SD;ND;CO;IA
ABSTRACT: The primary objective is an ecosystem study of the present status, distribution, and habitat requirements of important endemic, endangered, and threatened fishes of the Upper Colorado and Missouri Basins. The scope of this project is focused on the Colorado River Basin from Glen Canyon Dam upstream and the Missouri River Basin from Sioux City, IA upstream. Annotated and indexed bibliographies of all published and available unpublished technical information including current studies pertaining to aquatic fauna, flora, and habitat characteristics of the two river systems will be compiled. Project emphasis will be on endangered, threatened, and selected endemic fish of the area, but all technical information pertinent to the river ecosystem and habitat characteristics of these fish will be included. A series of detailed study proposals for short-term studies will be prepared. The studies will be designed to fill specific data gaps concerning the distribution, ecology, and habitat requirements of target fish. Field studies based on the study proposals will be conducted following approval by the Project Officer.
REPORTS AND PUBLICATIONS: (1) An indexed and annotated bibliography of published and unpublished technical information regarding aquatic fauna of the Upper Colorado and Missouri River systems; (2) A set of maps and overlays for each river system delineating distribution, spawning and rearing area, physical and chemical characteristics and locations of past and present field studies; (3) An evaluation report of the ecosystem of the Upper Colorado River system based on the compiled data base; (4) A report on the habitat requirements of juvenile Colorado River squawfish; (5) A report on squawfish spawning behavior. Information on the availability of these publications may be obtained from the Project Officer, Harvey Doerksen, U.S. Fish and Wildlife Service, WELUT, Federal Bldg., Fort Collins, CO 80251.
RECORD NUMBER: OWRC-1099
RIP NUMBER: 007685

<1212>
PROJECT TITLE: Northern Great Plains regional aquifer-system analysis
DURATION: 10/77-09/80
PRINCIPAL INVESTIGATOR(S): Dinwiddie, G.
PHONE: C(303)234-2018
RESEARCH INSTITUTE: Geological Survey, Lakewood, Colo.
SPONSOR: Geological Survey, Reston, Va.
FUNDING: 1978-$3,200,000
LOCATION: MT;SD;ND;WY
ABSTRACT: This three-year study of regional aquifers will focus on the Northern Great Plains region, while a five-year investigation is planned of the High Plains of the Ogalalla and associated aquifers in NE, KS, OK, NM, TX, CO, SD, and WY. A third study to commence this year involves a four-year investigation of California's Central Valley. The objectives of the three studies are to determine: (1) aquifer boundaries, thickness, saturation and transmissivity; (2) suitability of overlying wells and land for artificial recharge programs; (3) depth, quality and temperature of water; (4) storage capacity at various groundwater levels; (5) source of pollutants found in the aquifer; (6) the natural discharge and principal withdrawals from the aquifer; (7) sources and amounts of recharge; (8) anticipated yields; (9) the effect of pumping on surface supplies; (10) extent of past groundwater mining and the estimated economic life of the aquifer under various assumptions as to rates of withdrawals; and (11) susceptibility of aquifer to operation and management on a sustained yield basis.
RECORD NUMBER: OWRC-1199
RIP NUMBER: 008717

ENVIRONMENTAL SCIENCES, AQUATIC
CHEMICALS MONITORING AND TRANSPORT
(SEE ALSO 1089, 1092, 1221, 1222)

<1213>
PROJECT TITLE: Microbiology of black water
PROJECT NUMBER: 007 EY-77-C-04-3913
DURATION: 06/77-12/77
PRINCIPAL INVESTIGATOR(S): Adams, J.C.
PHONE: C(307)766-3218
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center
PROJECT MONITOR: Poulson, R. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2211
FUNDING: 1977-$9,100
LOCATION: WY
ABSTRACT: With apparently depleting reserves of oil, the development of oil shale as an energy source appears more plausible. If this development takes place, a possible water pollution problem becomes evident by natural waters associated with certain oil shale deposits. This is known as black water in the trona region. Work, thus far, indicates a need to more fully define the rate, type and magnitude of bacterial growth which can occur in the black water. Further, the benefit of the bacterial growth as may be applied to waste treatment of the black water, needs to be elucidated. Also, the application of the results from the black water work needs to be extended to other waters associated with in situ oil shale processing or coal gasification. In order that these broad objectives can be accomplished, RMIEE is investigating the physiology and growth of bacteria in black water. This study will provide information which can be useful in the waste treatment of black water; the results can further be applied to the waste treatment of waters associated with in situ fossil fuel processing technologies.
RECORD NUMBER: OWRC-1085
RIP NUMBER: 007639

ENVIRONMENTAL SCIENCES, AQUATIC
SITE RESOURCE AND USE STUDIES
(SEE ALSO 1099, 1130, 1199, 1208, 1209, 1218)

<1214>
PROJECT TITLE: Habitat enhancement--aquatic systems
PROJECT NUMBER: 017-76
DURATION: 10/76-06/78
PRINCIPAL INVESTIGATOR(S): Horak, J.
PHONE: C(303)493-5703
RESEARCH INSTITUTE: Enviro Control, Inc., Fort Collins, Colo.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Isbinger, L. USF and WS, WELUT, Drake Creekside Bldg., 2625 Redwing Rd., Ft. Collins, CO 80521
FUNDING: 1977-$63,000; 1978-$63,000
LOCATION: CO;NM;OR;MT;ND;SD;WY;AZ;NV;CA;ID;UT;WA
ABSTRACT: The measures and/or program features of water development projects which were recommended by the Fish and Wildlife Service and were implemented by construction agencies will be surveyed. The recommended measures will be presented at Regional Workshops for Fish and Wildlife Service Regions 1, 2, and 6, for which regional offices are located in Portland, Albuquerque, and Denver, respectively. The measures that were recommended, and those that were implemented will be identified, and a preliminary assessment of problems associated with implementation of Fish and Wildlife Service recommendations in those cases where recommendations were not followed. The projects to be included in this study are dams, diversions, and related facilities that were constructed by a Federal agency, or licensed by the FPC. Thirty projects will be selected for study in each of the three Fish and Wildlife Service Regions.
REPORTS AND PUBLICATIONS: (1) A classification of habitat improvement features in terms of their effectiveness of accomplishing their intended purpose; (2) A handbook of interim guidance specifying the manner of incorporating selected habitat-improvement features into water-development projects.
RECORD NUMBER: OWRC
RIP NUMBER: 007642

<1215>
PROJECT TITLE: Survey of existing conditions below dams and diversions in the West
PROJECT NUMBER: WELUT No. 049-75
DURATION: 07/75-09/76
PRINCIPAL INVESTIGATOR(S): Nelson, W.; Hazel, C.
RESEARCH INSTITUTE: Enviro Control, Inc., Rockville, Md. ; Jones and Stokes Associates, Inc., Sacramento, Calif.
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Doerksen, H. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, F323-5287
FUNDING: 1976-$202,600
LOCATION: CA;WA;ID;OR;MT;WY;ND;SD;AZ;NM;UT;CO;NV
ABSTRACT: This project was a post-audit of approximately 100 dams and diversions to identify the instream-flow needs methodology used by the

<1215> CONT.
biologist, institutional cooperation and/or constraints in the implementation phase, and the actual impact of altered flows on fish and wildlife.
REPORTS AND PUBLICATIONS: (1) Assessment of Effects of Altered Stream Flow Characteristics on Fish and Wildlife, Part A: Rocky Mountains and Pacific Northwest, Executive Summary (FWS/OBS-76/28); (2) Final Report (FWS/OBS-76/29), NTIS Accn. No. PB 263 470/AS (PC:A07/MF:A01); (3) Rocky Mountain Case Studies (FWS/OBS-76/30), NTIS Accn. No. PB 263 471/AS (PC:A16/MF:A01); (4) Pacific Northwest Case Studies (FWS/OBS-76/31), NTIS Accn. No. PB 263 472/AS (PC:A18/MF:A01). Contact Harvey Doerksen, Project Officer, U.S. Fish and Wildlife Service, WELUT, Fort Collins, CO 80521, for availability.
RECORD NUMBER: OWRC-1103
RIP NUMBER: 007648

<1216>
PROJECT TITLE: Geochemical survey of waters of western coal regions
DURATION: 01/74-01/78
PRINCIPAL INVESTIGATOR(S): Feder, G.L.; Saindon, L.
PHONE: C(303)234-2404
RESEARCH INSTITUTE: Geological Survey, Denver, Colo.. Water Resources Div.
SPONSOR: Geological Survey, Denver, Colo.. Water Resources Div.
LOCATION: MT;ND;WY;UT;NM;AZ
ABSTRACT: The principal objective of the project is to make a reconnaissance geochemical survey of the area of energy resources in the Rocky Mountain Region and the Northern Great Plains. This project emphasizes the geochemistry of the ground waters in the Powder River and Fort Union Coal Regions. Field work in the Powder River Coal Region and most laboratory analyses have been completed. Further sampling of ground waters in the western coal regions will concentrate on establishing the extent of the geochemical similarity of waters in the remaining coal regions to those in the Fort Union and Powder River Coal Regions. Due to the similarities of lithology and structure among most of the Cretaceous and Tertiary coal regions in the Northern Great Plains and Rocky Mountain Coal Provinces, it is anticipated that the same general geochemical processes occur throughout the area. This study is part of Geochemical Survey of Western Coal Regions.
REPORTS AND PUBLICATIONS: Geochemical Survey of Western Coal Regions, First Annual Progress Report (Open File Report No. 74-250, 1974), Second Annual Progress Report (1975), Third Annual Progress Report (Open-File Report No. 76-729, 1976), Fourth Annual Progress Report (Open-File Report 77-872, 1977), U.S. Geological Survey.
RECORD NUMBER: OWRC-1132
RIP NUMBER: 008729

<1217>
PROJECT TITLE: Reversion of irrigated lands
PROJECT NUMBER: WELUT No. 053-75
DURATION: 06/75-06/77
PRINCIPAL INVESTIGATOR(S): Anderson, D.R.
PHONE: F586-7938
RESEARCH INSTITUTE: Utah Cooperative Wildlife Research Unit., Logan
SPONSOR: Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team
PROJECT MONITOR: Ash, B. Drake Creekside Bldg., 2625 Redwing Road, Ft. Collins, CO 80521, C(303)221-2040, F323-5287
FUNDING: 1976-$62,400; 1977-$62,400
LOCATION: ND;WY;CO;UT;NM;MT
ABSTRACT: This study was designed to describe the vegetative successional responses and the related wildlife population changes on lands that revert from irrigated to nonirrigated status, a condition that may result as water is diverted from agricultural to energy uses. Because of limited data available for analysis a more limited goal will be achieved with the results available during the third year and publication of certain related studies.
REPORTS AND PUBLICATIONS: (1) D.R. Anderson, E.C. Larsen, G.C. White, Succession on Irrigated Lands Reverted to Non-Irrigated Status: Final Report, June 1977, Utah Cooperative Wildlife Research Unit, Utah State Univ., Logan, UT: (2) Report on Evaluation of Alternatives to the Jackknife Estimator for Estimation of Small Mammal Density; (3) Report on Statistical Estimation of Plant Biomass from Quadrat Data; (4) A documented computer program developed to analyze plant biomass data, contact Bank Ash, Project Officer, Fish and Wildlife Service, WELUT, Federal Building, Fort Collins, CO 80521, for availability.
RECORD NUMBER: OWRC-1102
RIP NUMBER: 007649

ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

ASSESSMENT OF ENERGY TECHNOLOGIES

(SEE ALSO 1081, 1093, 1094, 1099, 1113, 1114, 1199, 1202, 1217)

<1218>

PROJECT TITLE: Water for energy, Missouri River reservoirs--environmental impact statement

DURATION: 01/76-12/77

PRINCIPAL INVESTIGATOR(S): Loomis, D.

PHONE: C(406)657-6214;F585-6214

RESEARCH INSTITUTE: Bureau of Reclamation, Billings, Mont.

SPONSOR: Bureau of Reclamation, Washington, D.C.

LOCATION: MT;ND;SD;WY

ABSTRACT: Pursuant to the National Environmental Policy Act of 1969, the U.S. Department of Interior has prepared an environmental impact statement describing the environmental impacts which could be expected if 1 million acre-feet of water is diverted from Missouri River Reservoirs for energy-related industrial development. The statement covers impacts of depletion of the water from the mainstem reservoir system and development and operation of a hypothetical mixture of industries and associated coal mining in eastern Montana, western North Dakota, western and central South Dakota, and northeastern Wyoming.

REPORTS AND PUBLICATIONS: A final environmental impact statement was issued on December 6, 1977, available from the Bureau of Reclamation, Billings, MT 59103.

RECORD NUMBER: OWRC-1190

RIP NUMBER: 008727

<1219>

PROJECT TITLE: Clyde Park-Dillon 161 kilovolt and 69 kilovolt transmission lines: environmental impact statement

DURATION: 06/74-04/76

PRINCIPAL INVESTIGATOR(S): Tsao, A.

PHONE: C(406)449-3780

RESEARCH INSTITUTE: Montana Dept. of Natural Resources and Conservation, Helena

SPONSOR: Montana Power Co., Butte

FUNDING: 1976-$47,400

LOCATION: MT

ABSTRACT: In accordance with the Montana Utility Siting Act, an application was submitted by Montana Power Company with the Dept. of Natural Resources and Conservation on June 6, 1974, for permission to construct an electric transmission line facility between Clyde Park and Dillon. This application was amended on June 30, 1975, to add a segment of 69 kilovolt transmission line. This EIS consists of an introduction, a description of methodology used, a need evaluation, a discussion of system alternatives, engineering design specifications, inventories and potential impact evaluation of environmental components of the study area, site-specific impact evaluations, and long-term considerations.

<1219> CONT.

REPORTS AND PUBLICATIONS: A draft EIS was issued in January 1976 and the final EIS was issued in April 1976, available from the Montana State Library, Helena, MT 59601.

RECORD NUMBER: OWRC-1183

RIP NUMBER: 008720

ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
ENVIRONMENTAL IMPACT STATEMENTS

(SEE ALSO 1101, 1102, 1103)

<1220>
PROJECT TITLE: Coal Creek State Forest: proposed oil and gas leases (environmental impact statement)
DURATION: 08/75-02/76
PRINCIPAL INVESTIGATOR(S): Hayden, B.; Knudsen, G.
PHONE: C(406)449-2074;C(406)449-3780
RESEARCH INSTITUTE: Montana Dept. of State Lands, Helena ; Montana Dept. of Natural Resources and Conservation, Helena
SPONSOR: Montana State Government, Helena
FUNDING: 1976-$30,000
LOCATION: MT
ABSTRACT: The impacts of leasing 7,759 acres of state land for oil and gas exploration and development in the Coal Creek State Forest were studied. Proposed disturbances on such land would initially be seismic exploration utilizing thumper trucks and geo phones. Subsequent disturbances could include road construction, drilling of exploration wells, and development of oil and gas discoveries into commercial production (pipelines, pumping stations, etc.). The existing environment of the areas is discussed including: history, climate, hydrology, water quality, geology, topography, soils, vegetation, wildlife, and socio-economics. Also included in the description of the existing environment are other on-going environmental studies in the area and management consideration on the state forest. Three possible alternatives available to the State Board of Land Commissioners are discussed including: approval of the sale of leases with special conditions, disapproval of the sale and deferment of the sale. Environmental impacts for each of the alternative actions are discussed.
REPORTS AND PUBLICATIONS: Final Environmental Impact Statement was issued February 15, 1976.
RECORD NUMBER: OWRC-1194
RIP NUMBER: 008731

BIOMEDICAL SCIENCES, APPLIED STUDIES
CHEMICALS METABOLISM AND TOXICITY

<1221>
PROJECT TITLE: Effects of aqueous effluents from in situ fossil fuel processing technologies on aquatic systems
PROJECT NUMBER: 001 EY-77-C-04-3913
DURATION: 04/77-12/77
PRINCIPAL INVESTIGATOR(S): Bergman, H.L.; Anderson, D.A.
PHONE: C(307)766-6265;C(307)766-6130
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie ; Environmental Protection Agency, Duluth, Minn.
PROJECT MONITOR: Parrier, D.S. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2274
FUNDING: 1977-$178,100
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center is currently developing the technology for in situ processing of oil shale, coal, and tar sands. Attendant with these processes is the copious production of aqueous waste effluents which pose a number of environmental concerns. It is imperative that environmental research efforts keep abreast with technological developments to ensure unhindered progress. The specific question which this work is to address is What effect do aqueous effluents derived from in situ processing have on aquatic ecosystems. To answer this question it is desired that aqueous effluents, principally those associated with in situ oil shale retorting and underground coal gasification, be evaluated in terms of: (1) toxicity to aquatic biota as determined by acute and chronic studies including growth and reproduction screening; (2) avoidance/preference response of aquatic species; (3) uptake, bioaccumulation, and metabolism in aquatic species; (4) biochemical, physiological, and pathological effects on aquatic species; and (5) degradation and residue kinetics in model laboratory microcosms.
RECORD NUMBER: DWRC-1097
RIP NUMBER: 007628

PLANTS

<1222>
PROJECT TITLE: Phytotoxicity and plant response to aqueous effluents derived from in situ fossil fuel processing
PROJECT NUMBER: 012 EY-77-C-04-3913
DURATION: 08/77-09/78
PRINCIPAL INVESTIGATOR(S): Skinner, Q.; Asplund, D.; Moore, T.
PHONE: C(307)766-4139
RESEARCH INSTITUTE: Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo.
SPONSOR: Department of Energy, Laramie, Wyo.. Laramie Energy Research Center; Wyoming Univ., Laramie
PROJECT MONITOR: Parrier, D.S. P.O. Box 3395, LERC, University Station, Laramie, WY 82071, C(307)721-2274
FUNDING: 1977-$83,900
LOCATION: WY
ABSTRACT: The Laramie Energy Research Center is currently developing the technology for in situ processing of oil shale, coal, and tar sands. Attendant with these processes is the copious production of aqueous waste effluents which pose a number of environmental concerns. The specific question which this work is to address is What effect do aqueous effluents derived from in situ fossil fuel processing have on plant organisms. To answer this question LERC requested a research program be devised which will study the effect of these aqueous effluents upon selected plants with the purpose of determining their impact and using this information as a basis for proposed course of action to prevent any harmful effects on the environment. The program is designed to progress from defined laboratory studies to actual on-site field investigations with the original studies focusing on the effects of organics found in the retort water. The ultimate goals are to recommend revegetation design features, evaluate food web implications, provide input for predictive modeling analysis, recommend extensions to more extensive multi-disciplinary research and provide requirements for control technology. The work will result in the development and evaluation of an experimental protocol suitable for evaluating plant responses to aqueous effluents derived from alternate in situ fossil fuel processing technologies.
RECORD NUMBER: OWRC-1096
RIP NUMBER: 007629

GEOSCIENCES
    MINERALOGY, PETROLOGY, AND ROCK MECHANICS

<1223>
PROJECT TITLE: Bench scale creep tests on rock salt
DURATION: 05/77-11/77
PRINCIPAL INVESTIGATOR(S): Grams, W.H.; Geasner, C.
PHONE: C(605)394-2344
RESEARCH INSTITUTE: South Dakota School of Mines and Technology, Rapid City
SPONSOR: Energy Research and Development Administration, Washington, D.C.. Div. of Waste Management and Transportation
PROJECT MONITOR: Russell, J.E. Union Carbide Corp., Nuclear Div., P.O. Box Y, Oak Ridge, TN 37830, C(615)483-6511
FUNDING: 1977-$29,300
LOCATION: SD
ABSTRACT: This project involves uniaxial stress creep testing of large blocks of rock salt. These blocks measure approximately 2 x 2 x 3 feet. Load is applied by means of flat jack in a large specially designed load frame. Temperature is not controlled, but temperature fluctuations are held to a minimum by an insulated test enclosure. Results include the deformation vs. time of a circular hole in the center of the block, the hole being perpendicular to the axis of the major principal stress.
RECORD NUMBER: OWRC-1225
RIP NUMBER: 009254

<1224>

PROJECT TITLE: Design, development, and testing of an energy-environment information transfer system

PROJECT NUMBER: 68-01-4697

DURATION: 08/77-08/78

PRINCIPAL INVESTIGATOR(S): Cornog, M.

PHONE: C(215)491-8200

RESEARCH INSTITUTE: Auerbach Associates, Inc., Philadelphia, Pa.

SPONSOR: Environmental Protection Agency, Denver, Colo.. Office of Energy Activities

FUNDING: 1978-$75,000

LOCATION: CO;ND;UT;MT;SD;WY

ABSTRACT: The purpose of this project is to design and test an energy/environment information transfer system which will have as its primary objective satisfying the information needs of EPA Region VIII users. The system must be implementable and must exhibit an efficient organizational arrangement. Nine basic tasks will be completed during the course of this project: (1) analyze the user and user needs; (2) define the system functions; (3) specification of system operations; (4) selection of storage media; (5) describe the organizational arrangement for system implementation; (6) define the steps involved in detailed systems design and implementation; (7) estimate the cost involved in implementation and routine operation of the system; (8) develop monitoring, evaluation, and accounting procedures; and (9) system testing.

REPORTS AND PUBLICATIONS: (1) Design, Development and Testing of an Energy-Environment Information Transfer System: User Needs Analysis and Functional Design, January 9, 1978, AAI-2428-Tr-1, prepared by Auerbach Associates, Inc., under Contract No. 68-01-4697 for the U.S. Environmental Protection Agency, Office of Energy Activities, Denver, CO; (2) Design, Development and Testing of an Energy/Environment Information Transfer System: Specification of System Operations, Storage Media and Organizational Arrangement, May 17, 1978, AAI-2428-TR-2, prepared by Auerbach Associates, Inc., under Contract No. 68-01-4697 for the U.S. Environmental Protection Agency, Office of Energy Activities, Denver, CO.

RECORD NUMBER: OWRC-1163

RIP NUMBER: 007961

LOCATION INDEX

States and geographical areas where the research is performed are contained in this index. For states the two-digit U.S. Postal Service Code is used. County names, however, are spelled out and are in the SUBJECT KEYWORD INDEX, rather than the Location Index.

LOCATION INDEX

AK 1154, 1177

AZ 1107, 1108, 1111, 1155, 1169, 1177, 1191, 1200, 1214, 1215, 1216

CA 1214, 1215

CO 1081, 1090, 1091, 1099, 1104, 1107, 1108, 1111, 1155, 1169, 1177, 1191, 1198, 1194, 1211, 1214, 1215, 1217, 1224

DC 1081, 1109

IA 1211

ID 1113, 1129, 1132, 1154, 1164, 1166, 1169, 1184, 1214, 1215

IL 1104

MN 1113

MT 1081, 1084, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1110, 1111, 1112, 1113, 1114, 1115, 1125, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1147, 1149, 1149, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1160, 1161, 1162, 1163, 1164, 1166, 1167, 1169, 1170, 1171, 1172, 1174, 1175, 1176, 1177, 1181, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1197, 1199, 1200, 1201, 1204, 1205, 1206, 1211, 1212, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1224

ND 1087, 1090, 1091, 1096, 1097, 1099, 1104, 1105, 1107, 1108, 1110, 1111, 1113, 1155, 1171, 1172, 1177, 1191, 1199, 1200, 1207, 1208, 1209, 1211, 1212, 1214, 1215, 1216, 1217, 1219, 1224

NE 1108, 1111, 1155, 1171, 1172

NM 1091, 1099, 1104, 1107, 1108,

NM 1111, 1155, 1169, 1177, 1191, 1198, 1199, 1200, 1214, 1215, 1216, 1217

NV 1108, 1111, 1155, 1168, 1169, 1175, 1214, 1215

OR 1104

OR 1129, 1132, 1150, 1154, 1164, 1166, 1184, 1214, 1215

PA 1104

SD 1093, 1090, 1108, 1111, 1126, 1146, 1155, 1159, 1171, 1172, 1178, 1179, 1199, 1202, 1203, 1211, 1212, 1214, 1215, 1218, 1223, 1224

UT 1090, 1091, 1099, 1104, 1107, 1108, 1111, 1155, 1169, 1191, 1198, 1199, 1200, 1214, 1215, 1216, 1217, 1224

WA 1113, 1129, 1132, 1150, 1154, 1164, 1166, 1184, 1214, 1215

WV 1104

WY 1082, 1085, 1086, 1087, 1090, 1091, 1093, 1095, 1096, 1097, 1098, 1099, 1103, 1104, 1105, 1107, 1108, 1110, 1111, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1126, 1132, 1150, 1154, 1155, 1158, 1165, 1166, 1169, 1171, 1172, 1173, 1177, 1178, 1180, 1182, 1183, 1184, 1191, 1195, 1196, 1198, 1199, 1200, 1202, 1204, 1210, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1221, 1222, 1224

PERSONAL NAME INDEX

Every investigator listed in the Investigator(s) field appears in this index.

PERSONAL NAME INDEX

Adams, J.C. 1213
Ahl, J.G. 1196
Alexander, J. 1138
Aer, A.F. 1116
Anderson, D.A. 1221
Anderson, D.H. 1217
Asplund, O. 1113, 1222
Asu, H. 1217
Auer, A. B. 1098
Avner, A. 1100
Badgley, J. 1194
Barry, B.J. 1111
Bartos, J. 1157
Bastrup, A.F. 1195
Beers, R. 1184
Bell, M.A. 1080
Bergantino, R.N. 1152
Bergman, H.L. 1221
Bermel, W. 1153
Bjudstad, A. 1207
Blackburn, K.A. 1172
Boggs, K. 1148
Bowersmith, J.A. 1104
Branch, K. 1110
Brandenbourg, C. 1082
Brimhall, P.B. 1159
Bronder, L. 1191
Bronder, L.D. 1107, 1108
Brown, S. 1131
Brown, S.J. 1130
Bronner, B. 1100
Bryan, D. 1177
Burris, W.J. 1033, 1205
Burroughs, E. 1097
Cameron, D.G. 1159
Carda, D. 1033
Carda, D.D. 1139
Carlisle, N. 1131
Chalmers, J.A. 1095
Christensen, M. 1123
Ciliberti, V.A. 1130
Clowers, B. 1117
Cochran, K. 1173
Cook, J.W. 1172
Cornog, R. 1223
Corpe, E.L. 1115
Crowe, D. 1210
Cunningham, A. 1123
Davidson, A.G. 1125
Davidson, R. 1155
Davidson, R.A. 1125
Dayton, I.E. 1205
Dinger, B.E. 1155
Dinwiddie, G. 1212
DocKter, L. 1035, 1115, 1117, 1119
Doerges, J. 1117
Doerksen, H. 1211, 1215
Drapes, A. 1193
Duncan, W.E. 1120
Dunham, G. 1159
Duran, A.A. 1180, 1190, 1192,
  1182, 1183, 1183
Dwyer, R. 1126
Eastvedt, R.B. 1166
Eliazer, I. 1188
Engellant, D. 1190
Erdman, J.A. 1200
Farrier, D. 1118
Farrier, D.S. 1122, 1124, 1221,
  1222
Feder, G.L. 1216
Fifield, L. 1208
Fitzpatrick, J. 1095
Foster, D.H. 1098
Fowlkes, C. 1136
Frankel, M. 1171
Freudenthal, D. 1097
Freudenthal, S. 1173
Fuerstenau, M.C. 1083
Gessner, C. 1223
Gladwell, J. 1129
Glasser, D. 1153
Gobby, P.L. 1106
Goldbach, W.R. 1150
Gordon, J. 1163
Grams, W.H. 1223
Grange, F. 1126
Greenberg, A. 1096, 1097, 1110
Gunn, R.D. 1082
Hamerski, F. 1110
Harris, G. 1085, 1119
Hartsog, W.S. 1097
Hasfurther, V. 1098
Hausknecht, D. 1126
Hayden, B. 1220
Hazel, C. 1215
Hedges, R. 1092
Herndon, C. 1110
Hewson, E.W. 1132
Hill, R. 1087
Hodel, D.P. 1164
Hodge, J.R 1190
Hodge, J.R. 1131
Horak, J. 1214
Hostetter, T. 1209
Hoven, J.E. 1170
Howald, R.A. 1139
Howard, C. 1093
Howatson, J. 1121
Hoyt, F.M. 1095
Hutchins, J.C. 1099
Hutchinson, H. 1082
Hutchinson, R.L. 1035
Ishinger, L. 1091, 1099, 1214
Iszler, J. 1159
Janis, D. 1093, 1101, 1102
Janis, D.R. 1113

PERSONAL NAME INDEX

Jelinek, D. 1097
Jelinek, J. 1110
Johnson, S. 1103
Jones, B. 1170
Jonte, R. 1083
Joseph, T. 1211
Kalbfleisch, R. 1151
Karr, D.J. 1154
Kimsev, A.P. 1176
King, B. 1210
King, W.P. 1195
Kissner, J.A. 1131, 1190
Klinger, R. 1181
Knudsen, G. 1220
Kolm, K. 1178
Konizeski, R.L. 1130
Krali, J. 1206
Lahrdine, R. 1169
Lamb, D.B. 1086
Lash, T. 1184
Lawson, D. 1156
Leighty, M. 1139
Leonard, A.K. 1113
Lindquist, C.B. 1179
Lingard, A.L. 1083
Linenbee, A.L. 1178
Loomis, D. 1218
McCann, E. 1208, 1209
McDaniels, D.K. 1132
McPeters, G.A. 1089
McGowan, T. 1199
McRoberts, D. 1178
Middlestadt, J. 1172
Miller, R. 1126
Miller, M.R. 1152
Miller, T. 1128
Moore, J. 1110
Moore, R. 1091
Moore, T. 1222
Moore, T.S. 1124
Morrow, P. 1103
Murray, P.E. 1109
Nagarajo Ras, C.R. 1132
Nelson, K.P. 1122
Nelson, W. 1215
Nicklin, M. 1092
Noble, R. 1119
Nunes, R. 1125
Nybo, J.R. 1112
Obermeier, J.L. 1150
Ogle, P.R. 1093
Olson, G. 1089
Orvis, J. 1137
Otis, T. 1197
Packnett, D. 1208, 1209
Palmer, B.R. 1083
Parker, D. 1199, 1204
Payne, G.F. 1201
Pennington, WH. 1081
Peterson, W. 1146
Plancher, B. 1086
Podcbnik, J. 1190
Polzin, P. 1167
Poulson, R. 1121, 1123, 1213
Preston, D. 1209
Rechtfertig, P. 1142
Redden, J.A. 1083, 1179
Reiff, I. 1171
Reihman, T. 1185
Reuter, W. 1159
Rieber, M. 1105
Rinehart, E. 1123
Rogers, D. C. 1098
Rogers, R.H. 1198
Rogers, S.J. 1186
Russell, J.E. 1223
Saindon, L. 1216
Samel, R.G. 1197
Savage, M. 1191
Savage, T. 1192
Savitz, D. 1090
Scarrah, W.P. 1084
Schitoskey, F. 1202
Schmidt, V.H. 1187
Schmitt, J. 1110
Schmitz, P. 1144
Schmitz, R. 1083
Shaffer, C. 1172
Shaffer, D. 1172
Simpson, T. 1172
Skilman, D. 1159
Skinner, Q. 1098, 1222
Smith, E.B. 1120
Smith, V.E. 1098
Snyder, S. 1187
Sonderegger, J.L. 1152, 1153, 1156
Soo, S.L. 1105
Sparks, J. 1204
Staples, C. 1110
Steadman, S. 1145
Stewart, R. 1199
Stewart, T. 1133
Stockton, W.M. 1162
Streeter, B. 1202
Stroup, R.L. 1128
Sudbury, J. 1083
Sulenes, N. 1141
Sundberg, E. 1087
Thompson, J.G. 1098
Tsao, A. 1219
Uresh, D. 1203
Van Voast, W.A. 1092
Verwolf, M.C. 1188
Vyse, E.P. 1158
Waddington, R. 1189
Ward, D.M. 1127

PERSONAL NAME INDEX

Warling, J.C. 1090

Wwand, B.L. 1098

Weirheimer, G. 1153

Wells, E.A. 1208, 1209

Whitman, W.C. 1207

Whitney, J.W. 1168, 1175, 1177

Wichers, W.F. 1098

Wiesner, L. 1206

Williams, S.E. 1124

Wilsner, L. 1088

Wilson, E.M. 1086

Winter, J. 1098

Winter, S. 1167

Wobber, F. 1168

Wobber, F.J. 1168, 1177

Wood, B. 1135

Woods, M. 1102

Yamamoto, T. 1203

York, M. 1096, 1097, 1110, 1173

Ziskind, W. 1126

ORGANIZATION INDEX

The names of the research institutes and sponsors are combined and listed in alphabetical order with the project numbers following.

ORGANIZATION INDEX

Action for Eastern Montana, Glendive, MT 1176

AERO-West, Missoula, Mont. 1134

AERO, Billings, Mont. 1174

Auerbach Associates, Inc., Philadelphia, Pa. 1224

Barbara Clowers, Great Falls, MT 1167

Basin Electric Power Cooperative, Bismarck, N.Dak. 1165, 1209

Battelle Columbus Labs., Ohio 1090, 1090

Bendix Aerospace Systems Div., Ann Arbor, Mich. 1198

Bonneville Power Administration, Portland, Oreg. 1168, 1164, 1166, 1166

Brian Wood, Loma, MT 1135

Bureau of Land Management, Portland, Oreg. 1113

Bureau of Mines, Denver, Colo. 1178

Bureau of Mines, Spokane, Wash.. Spokane Mining Research Center 1104

Bureau of Mines, Washington, D.C. 1105

Bureau of Reclamation, Billings, Mont. 1219

Bureau of Reclamation, Washington, D.C. 1218

Centaur Management Consultants, Washington, D.C. 1171

Center for Social and Environmental Concerns, Helena, MT 1180

Charles Fowlkes, Bozeman, MT 1136

Community Action of Laramie County, Cheyenne, WY 1180, 1182, 1183

Community Services Administration, Washington, D.C. 1182, 1183

Conoco Coal Development Co., Library, Pa. 1083

Cook (John W.) and Associates, Inc. , Chagrin Falls, Ohio 1172

Cooperative State Research Service, Washington, D.C. 1088, 1206

Department of Energy, Idaho Falls, Idaho. Idaho Operations Office 1159

Department of Energy, Laramie, Wyo. . Laramie Energy Research Center 1082, 1095, 1095, 1093, 1116, 1117, 1119, 1119, 1120, 1121, 1122, 1123, 1124, 1213, 1221, 1222

Department of Energy, Richland, Wash.. Richland Operations Office 1154

Department of Energy, Washington, D.C. 1094, 1129, 1132

Department of Energy, Washington, D.C.. Div. of Geothermal Energy 1153

Department of Health, Education, and Welfare, Washington, D.C. 1179

Department of Housing and Urban Development, Washington, D.C. 1196

District 11 Human Resources Development Council, Missoula, MT 1148

Drapes Engineering Firm, Great Falls, Mont. 1193

Eastern Montana Coll., Billings. Dept. of Biology 1125

Ecology Consultants, Inc., Fort Collins, Colo. 1091, 1211

Economic Development Administration, Washington, D.C. 1131, 1190

Energy Research and Development Administration, Washington, D.C. 1081, 1081

Energy Research and Development Administration, Washington, D.C.. Div. of Biomedical and Environmental Research 1169

Energy Research and Development Administration, Washington, D.C.. Div. of Geothermal Energy 1152, 1156

Energy Research and Development Administration, Washington, D.C.. Div. of Waste Management and Transportation 1223

Energy Research and Development Administration, Washington, D.C.. Office of Planning, Analysis, and Evaluation 1171, 1184

Enviro Control, Inc., Fort Collins, Colo. 1218

Enviro Control, Inc., Rockville, Md. 1215

Environmental Protection Agency, Cincinnati, Ohio 1087

Environmental Protection Agency, Cincinnati, Ohio. Health Effects Research Lab. 1090

Environmental Protection Agency, Denver, Colo.. Office of Energy Activities 1224

Environmental Protection Agency, Duluth, Minn. 1221

Federal Energy Administration, Washington, D.C. 1112, 1191

Fish and Wildlife Service, Fort Collins, Colo.. Western Energy and Land Use Team 1091, 1099, 1199, 1199, 1202, 1204, 1210, 1211, 1214, 1215, 1217

Fish and Wildlife Service, Washington, D.C.. Office of Biological Services 1199

Ford Foundation Energy Policy Project, Washington, D.C. 1205

Forest Service, Billings, Mont.. Custer National Forest 1201, 1203

Forest Service, Billings, Mont.. Surface Environment and Mining 1203, 1207

Forest Service, Bozeman, Mont.. Intermountain Forest and Range Experiment Station 1087

Forest Service, Fort Collins, Colo. . Rocky Mountain Forest and Range Experiment Station 1207

Forest Service, Kalispell, Mont. (USA). Flathead National Forest 1115

Forest Service, Rapid City, S.Dak.. Rocky Mountain Forest and Range Experiment Station 1203, 1203

Forest Service, Washington, D.C. 1115, 1166

Four Corners Regional Commission 1107, 1108, 1111, 1155, 1191

Ft. Belknap Planning Program, Harlem, MT 1161

Geological Survey, Denver, Colo.. Geologic Div. 1200, 1200

Geological Survey, Denver, Colo.. Water Resources Div. 1216, 1216

Geological Survey, Lakewood, Colo. 1212

Geological Survey, Reston, Va. 1212

Georgetown Univ., Washington, D.C.. Center for Strategic and International Studies 1109

Rittman Associates, Inc., Columbia, Md.. Environmental and Geosciences Dept. 1091

HRB Singer, Inc. State College, Pa. 1204

ORGANIZATION INDEX

Illinois Univ., Urbana. Center for Advanced Computation 1105

Institute of the Rockies, Missoula, Mont. 1194

James Orvis, Bozeman, MT 1137

John Alexander, Big Timber, MT 1138

John Gordon, Cascade, MT 1163

John W. Whitney, Inc., Reno, NV 1168, 1175

Jones and Stokes Associates, Inc., Sacramento, Calif. 1215

Los Alamos Scientific Lab., N.Mex. 1125, 1169

Max Leighty, Miles City, MT 1139

Missoula City-County Health Dept. 1197

Missoula City-County Health Dept., Air Pollution Control Div., Missoula, MT 1197

Missouri River Basin Commission, Helena, Mont. 1189

Montana Bureau of Mines and Geology, Billings 1092

Montana Bureau of Mines and Geology, Butte 1152, 1153, 1156

Montana Coll. of Mineral Science and Technology, Butte. Mineral Research Center 1140

Montana Commission of Higher Education, Helena 1205

Montana Dept. of Community Affairs, Helena 1100, 1100, 1176

Montana Dept. of Natural Resources and Conservation, Helena 1114, 1219, 1220

Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div. 1127, 1133, 1134,

Montana Dept. of Natural Resources and Conservation, Helena. Energy Planning Div. 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1147, 1148, 1149, 1151, 1157, 1151, 1162, 1163, 1174, 1181, 1185, 1192, 1194

Montana Dept. of State Lands, Helena 1093, 1094, 1095, 1101, 1102, 1103, 1220

Montana Energy Advisory Council, Helena 1112, 1112

Montana Energy and MHD Research and Development Inst., Inc., Butte 1106, 1170, 1186, 1187, 1188

Montana International Trade Commission, Butte 1131, 1190

Montana Office of Budget and Program Planning, Helena 1095

Montana Power Co., Butte 1167, 1167, 1219

Montana State Consumer Council, Helena 1167

Montana State Government, Helena 1152, 1153, 1156, 1193, 1220

Montana State Univ., Bozeman. Agricultural Experiment Station 1088, 1088, 1128, 1128, 1206, 1206

Montana State Univ., Bozeman. Dept. of Animal and Range Sciences 1201

Montana State Univ., Bozeman. Dept. of Biology 1158

Montana State Univ., Bozeman. Dept. of Chemical Engineering 1084

Montana State Univ., Bozeman. Dept. of Chemistry 1186, 1188

Montana State Univ., Bozeman. Dept. of Civil Engineering 1129

Montana State Univ., Bozeman. Dept. of Mechanical Engineering 1160, 1160, 1185

Montana State Univ., Bozeman. Dept. of Microbiology 1089, 1127

Montana State Univ., Bozeman. Dept. of Physics 1106, 1187

Montana Univ., Missoula. Forest and Range Experiment Station 1130, 1130

MONTCO, Billings, Mont. 1094

Mountain West Research, Inc., Billings, Mont. 1097, 1110

Mountain West Research, Inc., Tempe, Ariz. 1096

Mountainview Memorial Hospital, White Sulfur Springs, MT 1157

Natural Resources Defense Council, Inc., Palo Alto, Calif. 1184, 1184

NERCO, Inc., Helena, Mont. 1093

Norhwest Fund for the Environment 1184

Norm Solenes, Billings, MT 1141

North Dakota State Univ., Fargo. Dept. of Botany 1207

Northern Tier Pipeline Co., Helena, Mont. 1113, 1114

Nuclear Regulatory Commission, Washington, D.C. 1126

Office of Technology Assessment (U. S. Congress), Washington, D.C. 1168, 1175, 1177, 1177

Office of Water Research and Technology, Washington, D.C. 1089, 1092, 1130, 1158

Old West Regional Commission, Billings, Mont. 1170, 1172, 1173

Old West Regional Commission, Washington, D.C. 1107, 1108, 1111,

Old West Regional Commission, Washington, D.C. 1155, 1191

Oregon Environmental Foundation 1184

Oregon Inst. of Tech., Klamath Falls 1154

Oregon State Univ., Corvallis. Dept. of Atmospheric Science 1132

Otter Tail Power Co., Fergus Falls, Minn. 1208

Pacific Power and Light Co., Kalispell, Mont. 1149

Pacific Power and Light Co., Portland, Oreg. 1150, 1150

Peabody Coal Co., St. Louis, Mo. 1101

Peter Bechtfertig, Billings, MT 1102

Phil Morrow, Billings, MT 1143

Phillip Schmitz, Ronan, MT 1144

Richard Klinger, Helena, MT 1191

Rocky Mountain Inst. of Energy and Environment, Laramie, Wyo. 1082, 1085, 1086, 1098, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1213, 1221, 1222

Science Applications, Inc., Los Angeles, Calif. 1126

Shelby, City of, Mont. 1151

Shell Oil Co., Houston, Tex.. Mining Ventures Dept. 1103

Sierra Club, San Francisco, Calif.. National Water Resources Committee 1184

Skelly and Loy, Harrisburg, Pa. 1099

South Dakota Cooperative Wildlife Research Unit, Brookings 1202

ORGANIZATION INDEX

South Dakota School of Mines and Technology, Rapid City 1093, 1150, 1179, 1223

South Dakota School of Mines and Technology, Rapid City. Dept. of Geology and Geological Engineering 1178, 1178

South Dakota State Government, Pierre 1146

South Dakota State Univ., Brookings 1146

Sponsors Unspecified 1109

Stan Steadman, Glendive, MT 1145

Stearns-Roger Engineering Co., Denver, Colo. 1208, 1209

Terry Savage, Lolo, MT 1192

Theodore Barry and Associates, Los Angeles, CA 1104

Thomas Stewart, Helena, MT 1133

Utah Cooperative Wildlife Research Unit., Logan 1217

Water Resources Council, Washington, D.C. 1189

Western Coal Planning Assistance Project, Billings, MT 1096, 1097, 1110

Western Governors Regional Energy Policy Office, Denver, Colo. 1107, 1108, 1111, 1155, 1191

Westmoreland Resources, Helena, Mont. 1102

William M. Stockton, Grassrange, MT 1162

Wyoming Dept. of Economic Planning and Development, Cheyenne 1173

Wyoming Dept. of Game and Fish, Cheyenne 1210

Wyoming Office of Industrial Siting Administration, Cheyenne 1165

Wyoming State Government, Cheyenne 1195, 1196

Wyoming State Highway Dept., Cheyenne, WY 1195

Wyoming State Land Use Commission, Cheyenne 1196

Wyoming State Planning Coordinators Office 1173

Wyoming Univ., Laramie 1085, 1086, 1098, 1116, 1117, 1118, 1119, 1120, 1123, 1221, 1222

SUBJECT KEYWORD INDEX

Keywords help the user reduce the material to the subject matter of interest, and they can be used to manually search ERIS. Most of the keywords used in this publication were taken form DOE Energy Information Data Base: Subject Thesaurus, TID-7000-R3 (June 1978). However, some free-form vocabulary has been used when words or terms describing the project were not available in the thesaurus. To effectively utilize the index, a user interested specifically in projects on coal liquefaction, for example, may refer to the keywords "COAL LIQUEFACTION" and find a list of one or more project numbers which would enable the user to locate projects concerned with coal liquefaction within the ERIS Report.

SUBJECT KEYWORD INDEX

ABSORPTION REFRIGERATION CYCLE 1143

ACCURACY 1120

ACID MINE DRAINAGE 1089

ACTIVATION ANALYSIS 1120

AERIAL PROSPECTING 1153

AERIAL SURVEYING 1198, 1204

AEROSOLS 1197

AGRICULTURAL WASTES 1127, 1128

AGRICULTURE 1088, 1189, 1190, 1200

AIR 1136

AIR POLLUTION 1106, 1109, 1197

AIR QUALITY 1169, 1208, 1209

ALASKA 1154, 1177

ALBANY CO (WY) 1098

ALGAE 1127

ALKALI METAL COMPOUNDS 1084

ALKANES 1118

ALPHA SPECTROSCOPY 1120

AMERICAN INDIANHEAD MINE 1207

ANAEROBIC DIGESTION 1127

ANALOG SYSTEMS 1204

ANALYTICAL MICROWAVE SPECTROMETERS 1123

ANTELOPE VALLEY STATION 1209

APARTMENT BUILDINGS 1191

AQUATIC ECOSYSTEMS 1099, 1158, 1208, 1209, 1211, 1214, 1221

AQUATIC ORGANISMS 1221

AQUIFERS 1082, 1152, 1159, 1212

ARCHAEOLOGY 1209

ARCHITECTURE 1194

ARIZONA 1107, 1108, 1200, 1216

ARTESIAN WELLS 1159

ASPHALTS 1086

AUXILIARY HEATING 1139, 1141

AVOIDANCE 1221

BACTERIA 1089, 1124, 1213

BARGES 1105

BASELINE ECOLOGY 1199, 1200, 1202, 1208, 1209, 1211

BETA SPECTROSCOPY 1120

BIBLIOGRAPHIES 1211

BIG HORN CO (MT) 1089, 1093, 1095, 1102, 1103

BIG SKY COAL MINE 1101

BIOCHEMICAL REACTION KINETICS 1122, 1127

BIOCONVERSION 1089, 1213

BIOLOGICAL ACCUMULATION 1221

BIOLOGICAL ADAPTATION 1089, 1158, 1207

BIOLOGICAL EFFECTS 1122, 1209, 1221, 1222

BIOMASS 1128

BIOSYNTHESIS 1127, 1128

BITUMENS 1116

BLAINE CO (MT) 1161

BONNEVILLE POWER ADMINISTRATION 1164, 1184

BOOM TOWNS 1100, 1169

BUILDING MATERIALS 1086

BUILDINGS 1135, 1144, 1193

BI-PRODUCTS 1120

CALIBRATION STANDARDS 1123

CALIFORNIA 1212

CAMPBELL CO (WY) 1202

CAPACITY 1184

CAPITAL 1097, 1110, 1170

CARBON CO (WY) 1098

CARBON DIOXIDE 1083

CARBON MONOXIDE 1084

CARBONATE ROCKS 1083

CARBONATES 1188

CASCADE CO (MT) 1147, 1163

CATALYSIS 1084

CERAMICS 1187

CEREALS 1128

CHANNEL STABILIZATION 1087

CHARGE CARRIERS 1187

CHARGES 1182, 1183

CHEMICAL ANALYSIS 1120, 1123, 1200

CHEMICAL EFFLUENTS 1123, 1221, 1222

CHEMICAL FEEDSTOCKS 1084, 1112

CHEMICAL PROPERTIES 1084

CHEMICAL REACTION KINETICS 1106, 1119

CHEMICAL REACTION YIELD 1119

CHOTEAU CO (MT) 1135

CHROMATES 1187

COAL 1081, 1085, 1098, 1105, 1106, 1120, 1124, 1166, 1189, 1199, 1208, 1209, 1210

COAL DEPOSITS 1082, 1111

COAL GASIFICATION 1081, 1082, 1083, 1097, 1098, 1099, 1213, 1221, 1222

COAL INDUSTRY 1081, 1096, 1097, 1109, 1110, 1210

COAL LIQUEFACTION 1081, 1084, 1085, 1097

COAL LIQUIDS 1086, 1112

COAL MINES 1095, 1178, 1216

COAL MINING 1081, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1096, 1097, 1099, 1100, 1101, 1102, 1103, 1104, 1107, 1108, 1109, 1195, 1200, 1207, 1216, 1218

COAL PREPARATION 1097

COAL RESERVES 1097, 1110, 1189

COAL-FIRED MHD GENERATORS 1106

COLORADO 1107, 1108, 1212

COLORADO RIVER BASIN 1211

COLUMBIA RIVER 1129

COLUMBIA RIVER BASIN 1129

COMBUSTION 1081, 1106, 1197

COMBUSTION KINETICS 1116

COMMERCIAL BUILDINGS 1143

COMMERCIALIZATION 1154

COMMUNITIES 1081, 1090, 1095, 1096, 1100, 1108, 1171, 1173, 1176, 1191, 1196

COMPARATIVE EVALUATIONS 1105, 1107, 1108, 1136, 1154, 1204

COMPRESSED AIR ENERGY STORAGE 1162

SUBJECT KEYWORD INDEX

COMPUTER CALCULATIONS 1140, 1188
COMPUTER CODES 1140
COMPUTERS 1198
CONCENTRATING COLLECTORS 1143
CONSOL SYNTHETIC GAS PROCESS 1083
CONSTRUCTION 1112, 1113, 1114, 1130, 1148, 1191, 1220
CONTAMINATION 1165
CONVEYORS 1105
CORROSION 1083
COST 1109, 1126, 1128, 1160, 1167, 1191, 1194, 1195, 1204, 1224
COST ANALYSIS 1160, 1172
COST BENEFIT ANALYSIS 1105, 1154, 1171, 1190, 1191, 1194
COYOTE STATION 1208
CREEP 1223
CROPS 1146, 1152, 1206
CROW INDIAN RESERVATION 1102
CULTIVATION 1203
CULTIVATION TECHNIQUES 1127
CUSTER CO (MT) 1139
DAMS 1130, 1165, 1214, 1215
DATA 1153
DATA ACQUISITION 1098, 1120, 1132, 1149, 1150, 1152, 1156, 1172, 1178, 1198, 1210, 1211
DATA ANALYSIS 1082, 1090, 1092, 1096, 1100, 1107, 1109, 1112, 1198, 1200, 1208, 1209, 1224
DATA COMPILATION 1100, 1156, 1172, 1186, 1198, 1224
DATA PROCESSING 1198
DAWSON CO (MT) 1145
DECISION MAKING 1096, 1110, 1173, 1199
DECKER COAL MINE 1095
DECOMPOSITION 1221
DEHYDROGENASES 1124
DEMAND FACTORS 1189
DEMONSTRATION PROGRAMS 1081, 1131, 1134, 1135, 1137, 1144, 1145, 1146, 1150, 1151, 1174, 1180
DEPTH 1212
DESIGN 1140, 1219, 1224
DIFFUSION 1187
DIGITAL SYSTEMS 1198, 1204
DISTRIBUTION 1204, 1211
DISTRICT OF COLUMBIA 1171, 1177
DUCTS 1142
EARTH-COVERED BUILDINGS 1192, 1194
ECOLOGY 1158, 1204, 1215
ECONOMIC DEVELOPMENT 1218
ECONOMIC FEASIBILITY 1149, 1190
ECONOMIC IMPACT 1091, 1095, 1096, 1100, 1105, 1109, 1112, 1126, 1155, 1173, 1191
ECONOMICS 1104, 1105, 1107, 1108, 1110, 1126, 1128, 1149, 1155
ECOSYSTEMS 1199
EDUCATION 1132, 1134, 1174, 1176, 1179
EFFICIENCY 1140
ELECTRIC CONDUCTIVITY 1187
ELECTRIC GENERATORS 1134, 1161
ELECTRIC POWER 1109, 1130, 1184
ELECTRIC UTILITIES 1166, 1167, 1192, 1183
ELECTRICAL PROPERTIES 1187
ELECTRODES 1187
ELECTROLYTES 1188
ELECTRON MICROSCOPY 1121
EMISSION 1109
ENANTIOMORPHS 1118
ENDANGERED SPECIES 1211
ENERGY ACCOUNTING 1193
ENERGY ANALYSIS 1096, 1112, 1155
ENERGY CONSERVATION 1109, 1134, 1172, 1193, 1194, 1196
ENERGY CONSUMPTION 1109, 1172, 1192
ENERGY CONVERSION 1084, 1109, 1127
ENERGY DEMAND 1205
ENERGY FACILITIES 1169, 1205
ENERGY MANAGEMENT 1224
ENERGY MODELS 1170
ENERGY PARKS 1180
ENERGY POLICY 1155, 1170, 1173, 1181
ENERGY SOURCE DEVELOPMENT 1096, 1110, 1112, 1115, 1128, 1129, 1131, 1154, 1155, 1158, 1164, 1169, 1171, 1173, 1176, 1181, 1186, 1189, 1190, 1191, 1199, 1202, 1210, 1214, 1217, 1218, 1220
ENERGY SOURCES 1154, 1170, 1216
ENERGY SUPPLIES 1169, 1170
ENERGY TRANSPORT 1166
ENGINEERING 1105, 1179, 1219
ENHANCED RECOVERY 1117
ENVIRONMENTAL EFFECTS 1088, 1099, 1124, 1127, 1189, 1197, 1215, 1221, 1222
ENVIRONMENTAL IMPACT STATEMENTS 1081, 1093, 1094, 1098, 1101, 1102, 1103, 1113, 1114, 1164, 1218, 1219, 1220
ENVIRONMENTAL IMPACTS 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1100, 1101, 1102, 1103, 1105, 1109, 1110, 1113, 1114, 1115, 1130, 1155, 1158, 1164, 1165, 1169, 1184, 1186, 1189, 1199, 1201, 1202, 1208, 1209, 1210, 1214, 1216, 1219, 1220, 1224
ENZYMES 1122, 1124
ERRORS 1120
ETHANOL 1128
EVALUATION 1088, 1096, 1104, 1107, 1108, 1130, 1158, 1165, 1172, 1190, 1209, 1224
EXHAUST GASES 1120, 1123
EXPLOITATION 1220
EXPLORATION 1115, 1125, 1168, 1175, 1177, 1220
FALL RIVER CO (SD) 1153
FARM EQUIPMENT 1190
FEASIBILITY STUDIES 1107, 1128, 1157, 1159, 1160, 1161, 1163, 1192, 1194
FEDERAL COAL LAND 1111
FEED MATERIALS PLANTS 1126
FERGUS CO (MT) 1162
FERMENTATION 1128
FINANCIAL INCENTIVES 1181

SUBJECT KEYWORD INDEX

FINANCING 1126, 1191

FIREPLACES 1138

FISHERIES 1158

FISHES 1091, 1099, 1122, 1158, 1199, 1210, 1211, 1214, 1215

FLAT PLATE COLLECTORS 1147

FLATHEAD CO (MT) 1115, 1149, 1220

FLOW RATE 1157, 1215

FLOWSHEETS 1091

FLUE GAS 1106

FLUID INJECTION 1117

FLUID MECHANICS 1116

FLY ASH 1106

FOOD CHAINS 1222

FORECASTING 1089, 1090, 1092, 1154, 1166, 1170, 1173, 1189, 1202, 1205, 1219

FORESTS 1115, 1220

FORT BELKNAP INDIAN RESERVATION 1161

FOSSIL FUELS 1120

FOSSIL-FUEL POWER PLANTS 1099, 1208, 1209

FRACTURING 1117

FREONS 1141

FUEL CELLS 1187

FUELS 1179

FUNGI 1124

FURNACES 1190

GALLATIN CO (MT) 1136, 1137, 1195

GAMMA SPECTROSCOPY 1120

GAS ANALYSIS 1123

GAS CHROMATOGRAPHY 1084

GAS COMPRESSORS 1162

GAS INJECTION 1082

GAS YIELDS 1119

GENETICS 1158

GEOCHEMICAL SURVEYS 1125, 1200, 1216

GEOLOGIC STRUCTURES 1117

GEOLOGY 1153, 1179, 1209, 1220

GEOTHERMAL ENERGY 1155, 1189

GEOTHERMAL EXPLORATION 1152, 1157

GEOTHERMAL FLUIDS 1157, 1158

GEOTHERMAL HEATING SYSTEMS 1159

GEOTHERMAL RESOURCES 1152, 1153, 1154, 1155, 1156, 1193

GEOTHERMAL SPACE HEATING 1152, 1153, 1157, 1159

GEOTHERMAL WELLS 1157

GERMINATION 1088, 1207

GLAZING MATERIALS 1138

GOVERNMENT POLICIES 1103, 1109, 1111, 1115, 1164, 1168, 1175, 1205

GRASS 1201, 1206, 1207

GREEN RIVER FORMATION 1120

GREENHOUSES 1137, 1145

GROUND WATER 1089, 1092, 1125, 1165, 1212, 1216

GROWTH 1213, 1221

HABITAT 1099, 1202, 1210, 1211, 1214

HALIDES 1084

HALL EFFECT 1187

HANNA (WY) 1098

HARDING CO (SD) 1202

HEALTH HAZARDS 1090, 1186

HEAT PUMPS 1140, 1141

HEAT STORAGE 1136

HEAT TRANSFER FLUIDS 1136, 1141

HEATING SYSTEMS 1194

HERBS 1207

HIGH-TEMPERATURE FUEL CELLS 1188

HOSPITALS 1157

HOT SPRINGS 1159

HOT-DRY-ROCK SYSTEMS 1155

HOUSES 1133, 1139, 1142, 1149, 1191

HUMAN POPULATIONS 1090, 1095, 1191

HYBRID SYSTEMS 1134

HYDROCARBONS 1094

HYDROELECTRIC POWER 1129, 1131, 1189

HYDROELECTRIC POWER PLANTS 1129, 1184, 1192

HYDROGEN 1187

HYDROLOGY 1082, 1130, 1153, 1209

HYDROTHERMAL SYSTEMS 1155, 1164

IDAHO 1113, 1129, 1132, 1154

IMAGE PROCESSING 1204

IN-SITU COMBUSTION 1116

IN-SITU GASIFICATION 1082, 1098, 1099, 1213, 1221, 1222

IN-SITU PROCESSING 1098, 1117, 1120, 1124

IN-SITU RETORTING 1098, 1119, 1122, 1123, 1213, 1221, 1222

INCOME 1107

INDUSTRIAL WASTES 1127

INDUSTRY 1190, 1205, 1218

INFORMATION CENTERS 1174

INFORMATION NEEDS 1224

INFORMATION RETRIEVAL 1110

INFORMATION SYSTEMS 1097, 1110, 1172, 1224

INFRARED SURVEYS 1153, 1204

INJURIES 1201

INORGANIC COMPOUNDS 1120

INSOLATION 1132, 1133

INSTALLATION 1149

INVENTORIES 1112, 1202

IRRIGATION 1152, 1217

JOSEPHINE CO (OR) 1150

KANSAS 1212

KEROGEN 1119

KGRA 1154

KNIFE RIVER BASIN 1208, 1209

KRYPTON 85 1117

LABOR 1097

LACTATE DEHYDROGENASE 1122

LAKE CO (MT) 1144

LAKES 1130

LAND RECLAMATION 1087, 1099, 1104, 1111, 1126, 1130, 1176, 1200, LAND RECLAMATION 1203, 1206, 1207

LAND TRANSPORT 1105, 1195

LAND USE 1097, 1115, 1168, 1175, 1177, 1189, 1195, 1196, 1198, 1199, 1201, 1204, 1210, 1217

LANE CO (OR) 1150

LANTHANUM COMPOUNDS 1187

LARAMIE (WY) 1098

LARAMIE CO (WY) 1182, 1183

LARAMIE ENERGY RESEARCH CENTER 1098

LARAMIE RIVER STATION 1165

LAWS 1181

LEACHING 1087

LEASES 1195

LEASING 1111, 1115, 1220

LEGAL ASPECTS 1100, 1108, 1111, 1115, 1126, 1168, 1177, 1181, 1189, 1220

LEGISLATION 1100, 1126, 1181

LEWIS AND CLARK CO (MT) 1133

LIBRARIES 1134

LIFE-CYCLE COST 1193

LIGNITE 1083, 1084

LIMESTONE 1152

LIMNOLOGY 1208

LIQUID WASTES 1122, 1124, 1221, 1222

LIQUIDS 1136

LIVER 1122

LOAD MANAGEMENT 1166, 1167

LOCAL GOVERNMENT 1097, 1100, 1196

LOW INCOME GROUPS 1148, 1182, 1183

MADISON FORMATION 1159

MADISON LIMESTONE 1152

MADISON RIVER VALLEY 1153

MAGNETOHYDRODYNAMICS 1186

MAINTENANCE 1086

MANAGEMENT 1189

MANUALS 1091, 1099, 1110, 1171, 1198

MANUFACTURING 1190

MANURES 1127

MAPPING 1153

MAPS 1153, 1176

MARKET 1154

MARYLAND 1091, 1215

MATHEMATICAL MODELS 1032, 1096, 1116, 1170, 1202, 1222

MEAGHER CO (MT) 1157

MEASURING INSTRUMENTS 1133, 1149

MEETINGS 1174

MERCER CO (ND) 1209, 1209

METABOLISM 1122, 1124, 1221

METALLURGY 1179

METEOROLOGY 1132, 1160, 1208, 1209

METHANE 1127

MHD GENERATORS 1186

MHD POWER PLANTS 1186

MICHIGAN 1198

MICROORGANISMS 1124

MICROSCOPY 1121

MICROSTRUCTURE 1106

MICROWAVE RADIATION 1123

MILL TAILINGS 1126

MINERAL CO (MT) 1192

MINERAL INDUSTRY 1168, 1175, 1178

MINERAL LEASING ACT 1111

MINERAL RESOURCES 1168, 1175, 1177, 1179

MINERALS 1168, 1175, 1178

MINES 1178

MINING 1156, 1168, 1175, 1176, 1179

MINING EQUIPMENT 1108

MINNESOTA 1113

MISSOULA CO (MT) 1134, 1148, 1194, 1197

MISSOURI RIVER 1208

MISSOURI RIVER BASIN 1096, 1097, 1110, 1189, 1211, 1218

MIXTURES 1085

MOBILE HOMES 1136, 1191

MODIFICATIONS 1195

MOLTEN SALTS 1084, 1188

MONITORING 1083, 1090, 1126, 1133, 1149, 1163, 1163, 1193

MONTANA 1089, 1093, 1094, 1095, 1100, 1101, 1102, 1103, 1107, 1108, 1112, 1113, 1114, 1115, 1125, 1128, 1129, 1130, 1132, 1151, 1152, 1153, 1154, 1156, 1157, 1160, 1161, 1163, 1167, 1170, 1174, 1176, 1185, 1190, 1193, 1197, 1200, 1201, 1205, 1216, 1218, 1219, 1220

MULTNOMAH CO (OR) 1150

MUSSELSHELL CO (MT) 1125

NAHCOLITE 1121

NAPHTHA 1120

NATIONAL ENVIRONMENTAL POLICY ACT 1098, 1218

NATIONAL GOVERNMENT 1109

NATRONA CO (WY) 1150

NATURAL GAS DEPOSITS 1112, 1115, 1220

NEBRASKA 1108, 1212

NEUTRON ACTIVATION ANALYZERS 1120

NEUTRON REACTIONS 1120

NEVADA 1108

NEW MEXICO 1107, 1108, 1200, 1212, 1216

NICKEL 1175

NORTH DAKOTA 1107, 1109, 1113, 1200, 1207, 1208, 1209, 1216, 1218

NORTHERN CHEYENNE INDIAN RESERVATION 1094

NORTHERN TIER PIPELINE 1113, 1114

NUCLEAR MAGNETIC RESONANCE 1084

OFF-ROAD VEHICLES 1201

OFFICE BUILDINGS 1140

OHIO 1172

OIL SANDS 1098, 1116, 1120, 1124, 1221, 1222

OIL SHALES 1085, 1098, 1117, 1118, 1119, 1122, 1123, 1124, 1199, 1213, 1221, 1222

OIL FIELDS 1119

OKLAHOMA 1212

SUBJECT KEYWORD INDEX

OPTICAL PROPERTIES 1114
OPTIMIZATION 1169
OREGON 1129, 1132, 1150, 1154
ORGANIC WASTES 1127
OVERBURDEN 1104
OXIDATION 1089, 1120
PARK CO (MT) 1219
PARTICLE SIZE 1106
PARTICLES 1197
PASSIVE SOLAR HEATING SYSTEMS 1141, 1142, 1194
PATHOLOGICAL CHANGES 1221
PEARL COAL MINE 1103
PENNINGTON CO (SD) 1083, 1179
PENNSYLVANIA 1099, 1204, 1224
PERFORMANCE 1140
PERFORMANCE TESTING 1140, 1144, 1149, 1185, 1224
PETROLEUM 1113, 1114
PETROLEUM DEPOSITS 1115, 1220
PETROLEUM REFINERIES 1112
PH VALUE 1124
PHOSPHATES 1175
PHOTOGRAPHY 1204
PHOTOVOLTAIC CONVERSION 1134
PHYSIOLOGY 1213
PILOT PLANTS 1083, 1085
PIPELINES 1112, 1113, 1114
PLANNING 1087, 1094, 1096, 1100, 1110, 1164, 1166, 1176, 1177, 1184, 1189, 1190, 1196, 1225,
PLANNING 1220
PLANT GROWTH 1207, 1217, 1222
PLANTS 1088, 1115, 1198, 1202, 1204, 1206, 1209, 1211, 1217, 1220, 1222
PLATTE CO (WY) 1165
PNEUMATIC TRANSPORT 1105
POLLUTION REGULATIONS 1091
POPULATION DENSITY 1204
POPULATION DYNAMICS 1095, 1191, 1202, 1211, 1217, 1222
POWDER RIVER 1093
POWDER RIVER BASIN 1081, 1173, 1216
POWER DEMAND 1167, 1192
POWER DISTRIBUTION 1164
POWER GENERATION 1130, 1163, 1166, 1184, 1188
POWER METERS 1167, 1193
POWER POTENTIAL 1163
POWER SYSTEMS 1164
POWER TRANSMISSION 1164
POWER TRANSMISSION LINES 1165, 1219
PREFERRED SPECIES 1088, 1207
PRESSURE DEPENDENCE 1119
PRESSURIZING 1082
PRODUCTIVITY 1088, 1107
PROPERTY VALUES 1107, 1108
PUBLIC LANDS 1115, 1155, 1220
PUBLIC SERVICES 1174
PUBLIC UTILITIES 1090
PUMPS 1161
PYROLYSIS 1119, 1121
RADIATION DETECTORS 1117
RADIOACTIVE WASTE MANAGEMENT 1126
RADIOACTIVE WASTES 1126
RADIOASSAY 1120
RAIL TRANSPORT 1105
RAILWAYS 1094, 1103
RAIN 1206
RATE STRUCTURE 1109, 1182, 1183
RATS 1122
RECOMMENDATIONS 1100, 1109, 1115, 1126
RECREATIONAL AREAS 1201
RECYCLING 1086, 1190
RED ROCK CREEK 1153
REDUCTION 1089
REFINING 1084
REGIONAL ANALYSIS 1091, 1108, 1111, 1126, 1155, 1164, 1166, 1168, 1169, 1175, 1184, 1189, 1191, 1199, 1214, 1216, 1218, 1224
REGULATIONS 1091, 1097, 1109, 1111, 1168, 1173, 1181, 1199, 1218
RENEWABLE ENERGY SOURCES 1131, 1152, 1174, 1181, 1185, 1189, 1196, 1197
REPRODUCTION 1221
RESEARCH PROGRAMS 1172, 1179
RESIDENTIAL BUILDINGS 1147, 1180
RESIDENTIAL SECTOR 1160, 1167, 1196, 1197
RESOURCE ASSESSMENT 1168, 1175
RESOURCE CONSERVATION 1199
RESOURCE POTENTIAL 1152, 1153, 1154
RESOURCES 1190
RETENTION 1206
RETORTING 1085, 1119
RETORTS 1122
RETROFITTING 1134, 1135, 1139, 1142, 1147, 1148, 1193
REVEGETATION 1088, 1200, 1203, 1206, 1207, 1217, 1222
REVERSE COMBUSTION 1082, 1116
RIVERS 1199, 1215
ROADS 1086, 1195
ROCK BEDS 1138, 1139, 1144
ROCK SPRINGS (WY) 1098
ROCKS 1178
ROCKY MOUNTAIN REGION 1169, 1200
ROOFS 1138
ROSEBUD CO (MT) 1094, 1095, 1101
RUNOFF 1087
RURAL AREAS 1160
SAFETY 1186
SALT DEPOSITS 1223
SATELLITES 1198
SATURATION 1212
SAVONIUS ROTORS 1162
SCHOOL BUILDINGS 1159
SEASONAL VARIATIONS 1202

SUBJECT KEYWORD INDEX

SEDIMENTS 1125

SEEDS 1088, 1128, 1207

SEISMIC SURVEYS 1220

SENSIBLE HEAT STORAGE 1137, 1138, 1139, 1144, 1145, 1151

SENSITIVITY 1120

SEPARATION PROCESSES 1084, 1120

SEWAGE 1127

SHALE OIL 1086

SHERIDAN CO (WY) 1093, 1095, 1103

SHRUBS 1200, 1203

SILICATES 1188

SILVER BOW CO (MT) 1140

SIMULATION 1082, 1202

SITE SELECTION 1090, 1101, 1102, 1165, 1169, 1196, 1205, 1208, 1219

SIZE 1140

SLURRY PIPELINES 1105

SNOW 1206

SOCIAL IMPACT 1081, 1095, 1096, 1100, 1108, 1109, 1110, 1171, 1186, 1189, 1191

SOCIAL SERVICES 1090, 1110

SOCIO-ECONOMIC FACTORS 1081, 1095, 1096, 1097, 1100, 1108, 1110, 1169, 1182, 1183, 1189, 1191, 1208, 1220

SODIUM CHLORIDES 1223

SOILS 1124, 1200, 1206, 1209, 1220

SOLAR AIR CONDITIONING 1133, 1143, 1143

SOLAR AIR HEATERS 1136, 1138, 1139, 1144

SOLAR CELL ARRAYS 1134

SOLAR CELLS 1134

SOLAR COLLECTORS 1135, 1138, 1140, 1143

SOLAR DRYERS 1146

SOLAR DRYING 1146

SOLAR ENERGY 1131, 1132, 1180, 1189, 1190

SOLAR HEATING 1143

SOLAR HEATING SYSTEMS 1134, 1135, 1136, 1137, 1138, 1139, 1143, 1144, 1145

SOLAR SPACE HEATING 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1143, 1144, 1145, 1194

SOLAR WATER HEATERS 1134, 1138, 1139, 1141, 1143, 1147, 1148, 1149, 1150, 1151

SOLAR WATER HEATING 1133, 1134, 1139, 1141, 1151

SOLAR-ASSISTED HEAT PUMPS 1140

SOLID WASTES 1090

SOLVENT EXTRACTION 1084

SOLVENT-REFINED COAL 1084

SOUTH DAKOTA 1083, 1108, 1159, 1202, 1203, 1212, 1219

SPACE HEATING 1194, 1197

SPECIFICATIONS 1219

SPECTRA 1118

SPECTROMETERS 1120

SPECTROSCOPY 1118, 1123

SPOIL BANKS 1087, 1088, 1104, 1200, 1203, 1206, 1207

STATE GOVERNMENT 1107, 1108, 1109, 1111, 1126, 1172, 1193

STATIC LOADS 1223

STATIONARY POLLUTANT SOURCES 1109

STEAM 1085

STEAM GENERATORS 1209

STORM WINDOWS 1139

STREAMS 1125, 1130, 1158

STRESSES 1223

STRUCTURAL CHEMICAL ANALYSIS 1121

SUBSURFACE STRUCTURES 1194

SULFATES 1089

SULFIDES 1089

SULFUR 1089

SULFUR DIOXIDE 1083

SURFACE MINING 1087, 1088, 1089, 1091, 1093, 1094, 1095, 1099, 1101, 1102, 1103, 1104, 1107, 1111, 1203, 1206, 1207

SURFACE WATERS 1089, 1125

SWEET GRASS CO (MT) 1138

SWEETWATER CO (WY) 1098

SWIMMING POOLS 1151

SYNTHETIC FUELS 1084, 1112

SYNTHETIC PETROLEUM 1086

SYSTEMS ANALYSIS 1154

TALC 1175

TAXES 1107, 1108, 1126

TECHNOLOGY ASSESSMENT 1081, 1091, 1097, 1099, 1106, 1128, 1130, 1148, 1158, 1186

TECHNOLOGY TRANSFER 1174, 1224

TEMPERATURE DEPENDENCE 1119

TEMPERATURE DISTRIBUTION 1212

TEMPERATURE MEASUREMENT 1156

TERRACE-PIT SYSTEM 1104

TERRESTRIAL ECOSYSTEMS 1201, 1202, 1207, 1208, 1209

TEST FACILITIES 1185

TEXAS 1212

THERMAL CONDUCTIVITY 1116

THERMAL DIFFUSIVITY 1116

THERMAL INSULATION 1139, 1142

THERMAL POWER PLANTS 1165, 1184, 1189

THERMAL SPRINGS 1152, 1153

THERMAL WATERS 1159

THERMODYNAMIC PROPERTIES 1188

THERMODYNAMICS 1188

THICKNESS 1212

TITANIUM 1175

TONGUE RIVER 1093, 1094

TOOLE CO (MT) 1151

TOPOLOGICAL MAPPING 1178, 1198, 1202, 1204

TOXICITY 1122, 1221

TRACE AMOUNTS 1083, 1106

TRACER TECHNIQUES 1117

TRAINS 1190

TRANSMISSION 1212

TRANSPORT 1081, 1103, 1104, 1105, 1109, 1113, 1113, 1114, 1177

TRANSPORTATION SECTOR 1175

SUBJECT KEYWORD INDEX

TRANSPORTATION SYSTEMS 1081, 1097, 1105, 1109, 1112, 1114, 1177, 1196

TREES 1203

TROUT 1122, 1158

UINTAH CO (UT) 1098

UNDERGROUND MINING 1099, 1107

UPTAKE 1221

URANIUM 1125, 1126

URANIUM MINES 1203

URANIUM RESERVES 1176

URBAN AREAS 1196

US DOE 1098

US DOI 1218

US EPA 1224

US NRC 1126

US ORGANIZATIONS 1219

USA 1081, 1109, 1168, 1175, 1214

USGS 1086

UTAH 1107, 1108, 1200, 1216

VALLEY CO (MT) 1131, 1190

VALLEY INDUSTRIAL PARK 1190

VEGETABLES 1137, 1145

VEHICLES 1201

VERNAL (UT) 1098

WASHINGTON 1113, 1129, 1132, 1153, 1154

WASTE DISPOSAL 1090

WASTE PRODUCT UTILIZATION 1099

WASTE WATER 1089, 1120, 1122, 1124, 1127, 1213, 1221

WASTES 1083

WATER 1137, 1145, 1156

WATER CHEMISTRY 1157

WATER POLLUTION 1213

WATER POLLUTION CONTROL 1222

WATER QUALITY 1089, 1090, 1092, 1158, 1189, 1212, 1215, 1216, 1218, 1220

WATER REQUIREMENTS 1097, 1189, 1217, 1219

WATER RESERVOIRS 1130, 1165, 1218

WATER RESOURCES 1129, 1130, 1156, 1189, 1199, 1212, 1214, 1216, 1217, 1218

WATER RIGHTS 1189

WATER TREATMENT 1213

WATERSHEDS 1130

WEATHER 1133, 1220

WELL DRILLING 1157, 1220

WELLS 1212

WESTMORELAND ABSALOKA COAL MINE 1102

WHEAT 1200

WILD ANIMALS 1091, 1093, 1199, 1202, 1209, 1210, 1215, 1217, 1220

WILDLIFE 1091

WIND 1163

WIND POWER 1131, 1134, 1160, 1163, 1190

WIND TURBINES 1134, 1151

WINDOWS 1142

WOOD 1194, 1197

WOOD BURNING FURNACES 1138, 1144, 1194, 1197

WYOMING 1082, 1095, 1103, 1107, 1108, 1132, 1150, 1154, 1178, 1182, 1183, 1200, 1202, 1210, 1212, 1216, 1218

X-RAY DIFFRACTION 1121

X-RAY FLUORESCENCE ANALYSIS 1121

YAKIMA CO (WA) 1150

YELLOWSTONE CO (MT) 1125, 1141, 1142, 1143

YELLOWSTONE NATIONAL PARK 1158

YELLOWSTONE RIVER BASIN 1189

PERMUTED TITLE INDEX

The permuted title index is a listing of the important keywords in context (KWIC) of each title. Each significant word in the title of a research project is printed in alphabetical order down the center of the page with the words that surround it in the title on either side of it. Thus, every title will appear in the index as many times as there are keywords in the title. For example, "Engineering Support: Retorting of Coal and Oil Shales" appears under the words "Engineering", " Retorting", "Coal" and "Oil Shales." Since the complete title usually fits on one line, the user may read the significant word in its entire context.

impact statement--Westmoreland	Absaloka Coal Mine expansion into	001102
/Assessment of transportation	access requirements for minerals	001177
commodities: analysis of /National	access restrictions for key mineral	001175
relocation policy and procedures to	accommodate energy development*	001195
solar greenhouse*	/Active solar hot water heating of a	001137
a Montana /Microbial sulfur cycle	activity in waters associated with	001089
and productivity of species	adapted to areas disturbed by strip	001088
/Ecological genetics of trout	adapted to the geothermally heated	001158
/Role of the Bonneville Power	Administration in the Pacific	001164
pre-project commitments to minimize	adverse environmental impacts and	001130
biological methane production from	agricultural, domestic, and	001127
/Homemade wind powered	air compressor*	001162
* /Wood burning and particulate	air pollution in the Missoula Valley	001197
exploration and development in	Alaska* requirements for minerals	001177
/ORD and CD of chiral	alkanes*	001118
impacts /Financial strategies for	alleviation of socioeconomic	001191
laboratory* /Development of an	alternative energy testing	001185
mobile homes*	/Alternative energy systems for	001136
energy future for the Pacific	/Alternative scenario: electrical	001184
and implementation of redevelopment	alternatives for Valley Industrial	001190
and numerical modeling, transient	analysis and hydrology studies of	001082
for key mineral commodities:	analysis of case studies*	001175
materials of /Thermodynamic	analysis of high temperature	001188
costs: an economic and engineering	analysis of truck, belt, rail,	001105
and Bureau of /Ex post facto	analysis of Army Corps of Engineers	001130
Beulah, ND* /Environmental impact	analysis of Coyote Station near	001208
/Evaluation of CIR imagery	analysis techniques*	001204
Mine proposals: a demographic	analysis* /Decker	001095
Plains regional aquifer-system	analysis* /Northern Great	001212
permit application: Units 1--3 of	/Analysis and evaluation of the	001165
environment for Basin Electric	/Analysis of physical and biological	001209
sub-micron fly ash from /Surface	analytical studies of micron and	001106
transient analysis and hydrology	/Analytical and numerical modeling,	001082
for establishment of perennial and	annual vegetation on topsoiled	001206
Basin Electric Power Cooperative's	Antelope Valley Station near	001209
process and mine waters for	aquatic habitat enhancement*	001099
/Habitat enhancement--	aquatic systems*	001214
fuel processing technologies on	aquatic systems*from in situ fossil	001221
	/Aquatic endangered species*	001211
situ /Biochemical studies with	aqueous effluents derived from in	001122
Phytotoxicity and plant response to	aqueous effluents derived from in	001222
of soil microorganisms with	aqueous effluents derived from in-	001124
fossil fuel processing /Effects of	aqueous effluents from in situ	001221
/Northern Great Plains regional	aquifer-system analysis*	001212
productivity of species adapted to	areas disturbed by strip mining*and	001088
of /Ex post facto analysis of	Army Corps of Engineers and Bureau	001130
of micron and sub-micron fly	ash from coal-fired MHD* studies	001106
vehicle impact on grasslands of the	Ashland Divison, Custer National	001201
for reclaiming deteriorated	asphalt pavement*and coal syncrudes	001086
adverse environmental impacts and	assess energy benefits* to minimize	001130
/Rocky Mountain regional energy	assessment program*	001169
/Environmental impact	assessment*	001098
and social impacts of MHD	/Assessment of environmental, safety	001186
requirements for minerals	/Assessment of transportation access	001177
a negotiating guide for small	/Assistance from energy developers:	001171
instrumentation /Montana solar-	assisted water heating facility and	001149
Reservoir--transmission lines and	associated facilities* Grayrocks	001165
sulfur cycle activity in waters	associated with a Montana coal	001099
/Upper Missouri River Basin Level	B study*	001189
water preheating/home heating wood	backup heating* /Solar domestic hot	001138
hot water preheating/heat pump	backup*Solar home heat and domestic	001141
analysis of truck, belt, rail,	barge, and coal slurry and	001105
/Powder River	Basin report (draft)*	001173
and biological environment for	Basin Electric Power Cooperative's	001209
/Upper Missouri River	Basin Level B study*	001189
potential--Columbia River	Basin/Idaho, Oregon, Washington,	001129
research project for the Fort	Belknap Indian Reservation* energy	001161
and engineering analysis of truck,	belt, rail, barge, and coal slurry	001105
*	/Bench scale creep tests on rock salt	001223
impacts and assess energy	benefits* adverse environmental	001130
/Solar space heating in Fort	Benton United Methodist Church*	001135
s Antelope Valley Station near	Beulah, ND* Power Cooperative'	001209
analysis of Coyote Station near	Beulah, ND* /Environmental impact	001208
statement--Peabody Coal Company's	Big Sky Mine extension* impact	001101
effluents derived from in situ	/Biochemical studies with aqueous	001122
Electric /Analysis of physical and	biological environment for Basin	001209
/Comprehensive survey of	biological methane production from	001127
/Microbiology of	black water*	001213
/Coal	board impact identification project*	001100
the Pacific Northwest /Role of the	Bonneville Power Administration in	001164
Solar heating of a small commercial	building* /	001183
conservation program for state	buildings in Montana* /Energy	001193
of Army Corps of Engineers and	Bureau of Reclamation projects in	001130
pollution in the Missoula /Wood	burning and particulate air	001197
materials of importance to molten	carbonate fuel cells* temperature	001188
/Solar heated	carpenter shop*	001144
via a combination of molten salt	catalysis and solvent refining	001084
/ORD and	CD of chiral alkanes*	001118
properties* /Fuel	cell materials--electrical	001187
importance to molten carbonate fuel	cells*high temperature materials of	001188
renewable energy demonstration	center for the New Western Energy	001174
from graded mine /Design of stable	channels to remove surface runoff	001087
fuel processing effluents by	/Characterization of in situ fossil	001123
/Direct conversion of lignite to	chemical feedstocks via a	001084
/ORD and CD of	chiral alkanes*	001118
in Fort Benton United Methodist	Church* /Solar space heating	001135
/Evaluation of	CIR imagery analysis techniques*	001204
gasification pilot plant, Rapid	City, South Dakota* CONSOL CO2 coal	001083
system load survey: residential	class* /Electrical	001167
/LANDSAT digital data	classification*	001198
69 kilovolt transmission lines:	/Clyde Park-Dillon 161 kilovolt and	001219
support: retorting of mixtures of	coal and oil shale* /Engineering	001085
planning reference system: /Western	coal energy development impact	001096
planning reference system: /Western	coal energy development impact	001097
planning reference system: /Western	coal energy development impact	001110
coal mine overburden handling and	coal extraction techniques* surface	001104
Rapid City, /Subcontract CONSOL CO2	coal gasification pilot plant,	001083
and hydrology studies of in situ	coal gasification recovery processes	001082
and evaluation of improved surface	coal mine overburden handling and	001104
Creek Coal Company's proposed	coal mine* Impact Statement--Spring	001093
axation of surface and underground	coal mining in western states* /	001107
/Taxation of	coal mining*	001109

survey of waters of western	coal regions* #Geochemical	001216
mining #Health implications of	coal related energy development:	001090
of truck, belt, rail, barge, and	coal slurry and pneumatic pipelines*	001105
Impact Statement--proposed MONTCO	coal strip mine* #Environmental	001094
in waters associated with a Montana	coal strip mine* cycle activity	001089
of liquids from shale oil and	coal syncrudes for reclaiming	001086
economic and #Comparative	coal transportation costs: an	001105
micron and sub-micron fly ash from	coal-fired MHD* studies of	001106
project*	# Coal board impact identification	001100
demonstration program (	# Coal research, development and	001081
Impact Statement--Spring Creek	Coal Company's proposed coal mine*	001093
impact statement--Peabody	Coal Company's Big Sky Mine	001101
oil and gas leases (environmental	# Coal Creek State Forest: proposed	001220
statement--Westmoreland Absaloka	Coal Mine expansion into section 36*	001102
statement--Shell's proposed Pearl	Coal Mine* #Environmental impact	001103
#National	Coal Policy Project*	001109
low-head hydroelectric potential--	Columbia River Basin/Idaho, Oregon,	001129
study of reverse and forward	combustion in tar sands* laboratory	001116
#Solar heating of a small	commercial building*	001143
the execution of pre-project	commitments to minimize adverse	001130
access restrictions for key mineral	commodities: analysis of case	001175
a negotiating guide for small	communities*from energy developers:	001171
costs: an economic and engineering	# Comparative coal transportation	001105
species adapted to #Establishment,	composition, and productivity of	001088
methane production from	# Comprehensive survey of biological	001127
#Homemade wind powered air	compressor*	001162
mining and mineral and mineral fuel	conservation fellowships* #Domestic	001179
buildings in Montana* #Energy	conservation program for state	001193
plant, Rapid City, #Subcontract	CONSOL CO2 coal gasification pilot	001083
solar hot water systems*	# Construction and installation of	001148
#Legal study of the extent of state	control over reclamation on federal	001111
feedstocks via a #Direct	conversion of lignite to chemical	001084
for Basin Electric Power	Cooperative's Antelope Valley	001209
#Ex post facto analysis of Army	Corps of Engineers and Bureau of	001130
Pacific #Potential energy	corridor requirements for the	001166
information needs, resources, and	costs* #Study of energy	001172
#Comparative coal transportation	costs: an economic and engineering	001105
#Environmental impact analysis of	Coyote Station near Beulah, ND*	001208
Rapid City, #Subcontract CONSOL	CO2 coal gasification pilot plant,	001083
in the upper parts of Red Rock	Creek and Madison River Valleys,	001153
Impact Statement--Spring	Creek Coal Company's proposed coal	001093
and gas leases (environmental #Coal	Creek State Forest: proposed oil	001220
#Bench scale	creep tests on rock salt*	001223
methodology for establishing siting	criteria for the State of Montana*a	001205
#Solar-electric	crop drying demonstration*	001146
#Northern Tier	crude oil study*	001112
establishment of #Flexible	cultural practices for	001206
grasslands of the Ashland Divison,	Custer National Forest* impact on	001201
from the Madison #Western South	Dakota usage of geothermal energy	001159
pilot plant, Rapid City, South	Dakota*CONSOL CO2 coal gasification	001083
Survey of existing conditions below	dams and diversions in the West* #	001215
demographic analysis*	# Decker Mine proposals: a	001095
elevated pressure* #Thermal	decomposition of kerogen under	001119
of nahcolite and its thermal	decomposition products*	001121
#Decker Mine proposals: a	demographic analysis*	001095
#Year-round renewable energy	demonstration center for the New	001174
#Energy park and	demonstration devices*	001180
#Coal research, development and	demonstration program (	001081
#Renewable energy	demonstration project*	001131
#Solar-electric crop drying	demonstration*	001146
of the Madison group at shallow	depth in eastern Montana* potential	001152
surface coal mine overburden	# Design and evaluation of improved	001104
tracer injection and detection	# Design and support for radioactive	001117
surface runoff from graded mine	# Design of stable channels to remove	001087
an energy-environment information	# Design, development, and testing of	001224
radioactive tracer injection and	detection system* and support for	001117
and coal syncrudes for reclaiming	deteriorated asphalt pavement* oil	001086
small #Assistance from energy	developers: a negotiating guide for	001171
#Energy park and demonstration	devices*	001180
#LANDSAT	digital data classification*	001198
transmission lines: #Clyde Park-	Dillon 161 kilovolt and 69 kilovolt	001219
temperatures in hardrock mining	districts of Montana* of mine-water	001156
of species adapted to areas	disturbed by strip mining*	001088
existing conditions below dams and	diversions in the West* #Survey of	001215
impact on grasslands of the Ashland	Divison, Custer National Forest*	001201
retrofit #Solar home heating and	domestic hot water preheating	001139
pump backup* #Solar home heat and	domestic hot water preheating/heat	001141
heating wood backup heating* #Solar	domestic hot water preheating/home	001138
wind electric #Solar heating and	domestic hot water/photovoltaic/	001134
exploration and mine development on	domestic public and private lands*	001168
production from agricultural,	domestic, and industrial resources	001127
mineral fuel conservation	# Domestic mining and mineral and	001179
the hydro-thermal power program--a	draft program environmental	001164
#Powder River Basin report (	draft)*	001173
#Solar-electric crop	drying demonstration*	001146
Madison group at shallow depth in	eastern Montana* potential of the	001152
relationships in a mixed-grass	# Ecological energetics and	001202
adapted to the geothermally heated	# Ecological genetics of trout	001158
coal transportation costs: an	economic and engineering analysis	001105
and relationships in a mixed-grass	ecosystem* #Ecological energetics	001202
of in situ fossil fuel processing	effluents by microwave spectroscope*	001123
#Biochemical studies with aqueous	effluents derived from in situ	001122
and plant response to aqueous	effluents derived from in situ	001222
of soil microorganisms with aqueous	effluents derived from in-situ	001124
processing #Effects of aqueous	effluents from in situ fossil fuel	001221
#Solar-	electric crop drying demonstration*	001146
* #Wind-	electric power generation in Montana	001160
hot water/photovoltaic/wind	electric system* and domestic	001134
biological environment for Basin	Electric Power Cooperative's	001209
Pacific #Alternative scenario:	electrical energy future for the	001184
#Fuel cell materials--	electrical properties*	001187
residential class*	# Electrical system load survey:	001167
decomposition of kerogen under	elevated pressure* #Thermal	001119
#Aquatic	endangered species*	001211
mixed-grass ecosystem* #Ecological	energetics and relationships in a	001202
#Rocky Mountain regional	energy assessment program*	001169
environmental impacts and assess	energy benefits*to minimize adverse	001130
the Pacific Northwest: #Potential	energy corridor requirements for	001166
New Western #Year-round renewable	energy demonstration center for the	001174
#Renewable	energy demonstration project*	001131
guide for small #Assistance from	energy developers: a negotiating	001171
reference system: #Western coal	energy development impact planning	001096

reference system: •Western coal	energy development impact planning	001097
reference system: •Western coal	energy development impact planning	001110
and procedures to accommodate	energy development• policy	001195
Health implications of coal related	energy development: mining impacts• •	001090
South Dakota usage of geothermal	energy from the Madison Formation•	001159
•Alternative scenario: electrical	energy future for the Pacific	001184
resources, and costs• •Study of	energy information needs,	001172
training site, Region 5 (•Solar	energy meteorological research and	001132
•Montana	energy model•	001170
•Study of geothermal	energy prospects in western states•	001155
survey of vegetation in the western	energy regions• •Geochemical	001200
Fort Belknap Indian •Wind	energy research project for the	001161
•Small-scale hydroelectric	energy supply system•	001192
•Alternative	energy systems for mobile homes•	001136
•Development of an alternative	energy testing laboratory•	001185
•Laboratory heated by solar	energy•	001180
to promote development of renewable	energy• and institutional study	001181
for the development of geothermal	energy• regional planning support	001150
development, and testing of an	energy-environment information	001224
environmental impact •Water for	energy, Missouri River reservoirs--	001218
•Western	Energy and Land Use Team (WELUT)•	001199
state buildings in Montana•	• Energy conservation program for	001193
devices•	• Energy park and demonstration	001180
	• Energy research project•	001176
center for the New Western	Energy Show• energy demonstration	001178
costs: an economic and	engineering analysis of truck,	001105
heating system •Feasibility and pre-	engineering planning of geothermal	001157
mixtures of coal and oil shale•	• Engineering support: retorting of	001085
facto analysis of Army Corps of	Engineers and Bureau of Reclamation	001130
and mine waters for aquatic habitat	enhancement• for utilizing process	001099
•Habitat	enhancement--aquatic systems•	001210
Analysis of physical and biological	environment for Basin Electric	001209
and testing of an energy-	environment information transfer	001224
Forest--USDA Forest Service	environmental impact statement•	001115
and 69 kilovolt transmission lines:	environmental impact statement•	001219
energy, Missouri River reservoirs--	environmental impact statement• for	001218
proposed oil and gas leases (	environmental impact statement)•	001220
commitments to minimize adverse	environmental impacts and assess	001130
power program--a draft program	environmental statement and	001160
impacts of MHD •Assessment of	environmental, safety and social	001186
Coyote Station near Beulah, ND•	• Environmental impact analysis of	001208
	• Environmental impact assessment•	001098
Peabody Coal Company's Big Sky	• Environmental impact statement--	001101
Westmoreland Absaloka Coal Mine	• Environmental impact statement--	001102
Shell's proposed Pearl Coal Mine•	• Environmental impact statement--	001103
and demonstration program	(Environmental Impact Statement)•	001081
Spring Creek Coal Company's	• Environmental Impact Statement--	001093
proposed MONTCO coal strip mine•	• Environmental Impact Statement--	001094
•Northern Tier Pipeline Project	(Environmental Impact Statement--	001110
•Flexible cultural practices for	establishment of perennial and	001206
productivity of species adapted to	• Establishment, composition, and	001089
•Feasibility of	ethanol from Montana grain•	001128
Corps of Engineers and Bureau of	• Ex post facto analysis of Army	001130
projects in Montana concerning the	execution of pre-project	001133
diversions in the West• •Survey of	existing conditions below dams and	001215
-Westmoreland Absaloka Coal Mine	expansion into section 36•statement-	001102
access requirements for minerals	exploration and development in	001177
•Oil and gas lease applications	exploration and development,	001115
framework: effects on mineral	exploration and mine development on	001168
Peabody Coal Company's Big Sky Mine	extension• impact statement--	001101
reclamation on •Legal study of the	extent of state control over	001111
mine overburden handling and coal	extraction techniques• surface coal	001108
derived from in situ fossil fuel	extraction technologies• effluents	001122
-transmission lines and associated	facilities• Grayrocks Reservoir-	001165
solar-assisted water heating	facility and instrumentation program•	001109
nursing home and present hospital	facility in White Sulfur Springs,	001157
impact planning reference system:	fact book• coal energy development	001097
Engineers and Bureau of •Ex post	facto analysis of Army Corps of	001130
planning of geothermal heating	• Feasibility and pre-engineering	001157
grain•	• Feasibility of ethanol from Montana	001128
state control over reclamation on	federal land•study of the extent of	001111
effects on mineral exploration and	• Federal regulatory framework:	001168
conversion of lignite to chemical	feedstocks via a combination of	001088
and mineral fuel conservation	fellowships• mining and mineral	001179
uranium mill tailings management•	• Financial and legal aspects of	001126
alleviation of socioeconomic	• Financial strategies for	001191
and sub-micron fly ash from coal-	fired MHD• studies of micron	001106
exploration and development,	Flathead National Forest--USDA	001115
establishment of perennial and	• Flexible cultural practices for	001206
studies of micron and sub-micron	fly ash from coal-fired MHD•	001106
Selection and increase of perennial	forbs for mine spoil reclamation in	001207
Flathead National Forest--USDA	Forest Service environmental impact	001115
Ashland Divison, Custer National	Forest• impact on grasslands of the	001201
and development, Flathead National	Forest--USDA Forest Service	001115
(environmental •Coal Creek State	Forest: proposed oil and gas leases	001220
geothermal energy from the Madison	Formation• South Dakota usage of	001159
energy research project for the	Fort Belknap Indian Reservation•	001161
•Solar space heating in	Fort Benton United Methodist Church•	001135
and laboratory study of reverse and	forward combustion in tar sands•	001116
effluents derived from in situ	fossil fuel extraction technologies•	001122
•Characterization of in situ	fossil fuel processing effluents by	001123
of aqueous effluents from in situ	fossil fuel processing technologies	001221
effluents derived from in situ	fossil fuel processing• to aqueous	001222
effluents derived from in-situ	fossil fuel processing•with aqueous	001124
exploration and •Federal regulatory	framework: effects on mineral	001168
of importance to molten carbonate	fuel cells• temperature materials	001189
mining and mineral and mineral	fuel conservation fellowships•	001179
derived from in situ fossil	fuel extraction technologies•	001122
•Characterization of in situ fossil	fuel processing effluents by	001123
effluents from in situ fossil	fuel processing technologies on	001221
derived from in-situ fossil	fuel processing• aqueous effluents	001124
derived from in situ fossil	fuel processing• aqueous effluents	001222
properties•	• Fuel cell materials--electrical	001187
scenario: electrical energy	future for the Pacific Northwest•	001184
and development, Flathead •Oil and	gas lease applications exploration	001115
State Forest: proposed oil and	gas leases (environmental impact	001220
City, •Subcontract CONSOL CO2 coal	gasification pilot plant, Rapid	001083
hydrology studies of in situ coal	gasification recovery processes•and	001092
•Wind-electric power	generation in Montana•	001160
	• Generic rate study•	001193
geothermally heated •Ecological	genetics of trout adapted to the	001158
the western energy regions•	• Geochemical survey of vegetation in	001200

PERMUTED TITLE INDEX

western coal regions* #	Geochemical survey of waters of	001216
#Western South Dakota usage of	geothermal energy from the Madison	001159
western states* #Study of	geothermal energy prospects in	001155
support for the development of	geothermal energy*regional planning	001154
and pre-engineering planning of	geothermal heating system for the	001157
parts of #Reconnaissance study of	geothermal potential in the upper	001153
group at #Phase zero study results--	geothermal potential of the Madison	001152
genetics of trout adapted to the	geothermally heated waters of	001158
local land use planning* #Statewide	goals, policies and guidelines for	001196
to remove surface runoff from	graded mine spoils* stable channels	001087
Feasibility of ethanol from Montana	grain* #	001128
and relationships in a mixed-	grass ecosystem* energetics	001202
Custer #Off road vehicle impact on	grasslands of the Ashland Divison,	001201
1--3 of the Laramie River Station,	Grayrocks Reservoir--transmission	001165
mild oxidation* #Upgrading of	Green River shale oil naphtha by	001120
#Solar heated	greenhouse*	001145
solar hot water heating of a solar	greenhouse* #Active	001137
of possible techniques to predict	groundwater quality in mined lands*	001092
energy developers: a negotiating	guide for small communities* from	001171
reference system: impact evaluation	guide* development impact planning	001096
#Statewide goals, policies and	guidelines for local land use	001196
process and mine waters for aquatic	habitat enhancement* for utilizing	001099
* #	Habitat enhancement--aquatic systems	001214
of land use changes affecting	habitats in Wyoming* #Status	001210
study of mine-water temperatures in	hardrock mining districts of Montana	001156
Columbia #Resource survey of low-	head hydroelectric potential--	001129
energy development: mining impacts*#	Health implications of coal related	001090
preheating/heat pump #Solar home	heat and domestic hot water	001141
and domestic hot water preheating/	heat pump backup* #Solar home heat	001141
#Laboratory	heated by solar energy*	001140
#Solar	heated carpenter shop*	001144
#Solar	heated greenhouse*	001145
Montana* #Solar	heated swimming pool in Shelby,	001151
#Wood	heated underground structure*	001194
trout adapted to the geothermally	heated waters of Yellowstone Park*	001158
preheating retrofit #Solar home	heating and domestic hot water	001139
photovoltaic/wind electric #Solar	heating and domestic hot water/	001134
#Montana solar-assisted water	heating facility and	001149
Methodist Church* #Solar space	heating in Fort Benton United	001135
building* #Solar	heating of a small commercial	001143
#Active solar hot water	heating of a solar greenhouse*	001137
#Solar home	heating project*	001142
#Solar hot water	heating project*	001150
engineering planning of geothermal	heating system for the new nursing	001157
#Residential solar water	heating system*	001147
domestic hot water preheating/home	heating wood backup heating* #Solar	001138
preheating/home heating wood backup	heating* #Solar domestic hot water	001138
#Weather station for Solar	Heights Subdivision*	001133
procedures to accommodate energy #	Highway relocation policy and	001195
heating system for the new nursing	home and present hospital facility	001157
preheating/heat pump backup* #Solar	home heat and domestic hot water	001141
preheating retrofit system* #Solar	home heating and domestic hot water	001139
#Solar	home heating project*	001142
Solar domestic hot water preheating/	home heating wood backup heating* #	001138
* #	Homemade wind powered air compressor	001162
energy systems for mobile	homes* #Alternative	001136
the new nursing home and present	hospital facility in White Sulfur	001157
greenhouse* #Active solar	hot water heating of a solar	001137
#Solar	hot water heating project*	001150
* #Solar home heating and domestic	hot water preheating retrofit system	001139
backup#Solar home heat and domestic	hot water preheating/heat pump	001141
wood backup heating*#Solar domestic	hot water preheating/home heating	001138
and installation of solar	hot water systems* #Construction	001148
#Solar heating and domestic	hot water/photovoltaic/wind	001134
including its participation in the	hydro-thermal power program--a	001164
#Small-scale	hydroelectric energy supply system*	001192
River #Resource survey of low-head	hydroelectric potential--Columbia	001129
sediment reconnaissance for uranium#	Hydrogeochemical and stream	001125
modeling, transient analysis and	hydrology studies of in situ coal	001092
and training site, Region 5 (	Idaho, Montana, Oregon, Washington,	001132
potential--Columbia River Basin/	Idaho, Oregon, Washington, Montana*	001129
#Coal board impact	identification project*	001100
#Evaluation of CIR	imagery analysis techniques*	001204
near Beulah, ND* #Environmental	impact analysis of Coyote Station	001208
#Environmental	impact assessment*	001098
impact planning reference system:	impact evaluation guide*development	001096
#Coal board	impact identification project*	001100
Divison, Custer #Off road vehicle	impact on grasslands of the Ashland	001201
#Western coal energy development	impact planning reference system:	001096
#Western coal energy development	impact planning reference system:	001097
#Western coal energy development	impact planning reference system:	001110
transmission lines: environmental	impact statement* and 69 kilovolt	001219
-USDA Forest Service environmental	impact statement* National Forest-	001115
River reservoirs--environmental	impact statement* energy, Missouri	001218
oil and gas leases (environmental	impact statement)* Forest: proposed	001220
Company's Big Sky #Environmental	impact statement--Peabody Coal	001101
Pearl Coal Mine* #Environmental	impact statement--Shell's proposed	001103
Absaloka Coal Mine #Environmental	impact statement--Westmoreland	001102
program (Environmental	Impact Statement)*and demonstration	001081
coal strip mine* #Environmental	Impact Statement--proposed MONTCO	001094
Company's proposed #Environmental	Impact Statement--Spring Creek Coal	001093
Pipeline Project (Environmental	Impact Statement--State)* Tier	001114
to minimize adverse environmental	impacts and assess energy benefits*	001130
for alleviation of socioeconomic	impacts in seven western states*	001191
of environmental, safety and social	impacts of MHD technology*	001186
related energy development: mining	impacts*Health implications of coal	001090
alternatives for #Evaluation and	implementation of redevelopment	001190
development: mining impacts*#Health	implications of coal related energy	001090
project for the Fort Belknap	Indian Reservation* energy research	001161
from agricultural, domestic, and	industrial resources of Montana*	001127
alternatives for Valley	Industrial Park, Montana*	001190
Wyoming* #Minerals	Industry Location System (MILS)--	001178
costs* #Study of energy	information needs, resources, and	001172
testing of an energy-environment	information transfer system* and	001224
and support for radioactive tracer	injection and detection system*	001117
systems* #Construction and	installation of solar hot water	001148
development of renewable #Legal and	institutional study to promote	001181
assisted water heating facility and	instrumentation program* solar-	001149
with aqueous effluents derived #	Interactions of soil microorganisms	001120
#Reversion of	irrigated lands*	001217
#Thermal decomposition of	kerogen under elevated pressure*	001119
#National access restrictions for	key mineral commodities: analysis	001175

transmission #Clyde Park-Dillon 161	kilovolt and 69 kilovolt	001219
Park-Dillon 161 kilovolt and 69	kilovolt transmission lines:	001219
forward #Mathematical modeling and	laboratory study of reverse and	001116
of an alternative energy testing	laboratory* #Development	001185
#	Laboratory heated by solar energy*	001180
in Wyoming* #Status of	land use changes affecting habitats	001210
policies and guidelines for local	land use planning* #Statewide goals,	001196
control over reclamation on federal	land* study of the extent of state	001111
#Western Energy and	Land Use Team (WELUT)*	001199
#Reversion of irrigated	lands*	001217
on domestic public and private	lands* and mine development	001168
groundwater quality in mined	lands* techniques to predict	001092
#	LANDSAT digital data classification*	001198
application: Units 1--3 of the	Laramie River Station, Grayrocks	001165
development, Flathead #Oil and gas	lease applications exploration and	001115
State Forest: proposed oil and gas	leases (environmental impact	001220
tailings management* #Financial and	legal aspects of uranium mill	001126
promote development of renewable #	Legal and institutional study to	001181
control over reclamation on #	Legal study of the extent of state	001111
a combination #Direct conversion of	lignite to chemical feedstocks via	001084
Grayrocks Reservoir--transmission	lines and associated facilities*	001165
and 69 kilovolt transmission	lines: environmental impact	001219
syncrudes for #Evaluation of	liquids from shale oil and coal	001086
#Electrical system	load survey: residential class*	001167
goals, policies and guidelines for	local land use planning* #Statewide	001196
#Minerals Industry	Location System (MILS)--Wyoming*	001178
Columbia River #Resource survey of	low-head hydroelectric potential--	001129
-geothermal potential of the	Madison group at shallow depth in	001152
usage of geothermal energy from the	Madison Formation* South Dakota	001159
upper parts of Red Rock Creek and	Madison River Valleys, southwestern	001153
aspects of uranium mill tailings	management* #Financial and legal	001126
mining effects and stipulations	manuals* #Surface	001091
analysis of high temperature	materials of importance to molten	001188
#Fuel cell	materials--electrical properties*	001187
laboratory study of reverse and #	Mathematical modeling and	001116
training site, Region #Solar energy	meteorological research and	001132
#Comprehensive survey of biological	methane production from	001127
space heating in Fort Benton United	Methodist Church* #Solar	001135
criteria for the #Development of a	methodology for establishing siting	001205
safety and social impacts of	MHD technology* of environmental,	001186
sub-micron fly ash from coal-fired	MHD* studies of micron and	001106
waters associated with a Montana #	Microbial sulfur cycle activity in	001089
#	Microbiology of black water*	001213
coal-#Surface analytical studies of	micron and sub-micron fly ash from	001106
studies of micron and sub-	micron fly ash from coal-fired MHD*	001106
effluents #Interactions of soil	microorganisms with aqueous	001128
nahcolite and its thermal #	Microtopological investigation of	001121
fossil fuel processing effluents by	microwave spectroscope* of in situ	001123
of Green River shale oil naphtha by	mild oxidation* #Upgrading	001120
and legal aspects of uranium	mill tailings management* #Financial	001126
#Minerals Industry Location System (	MILS)--Wyoming*	001178
effects on mineral exploration and	mine development on domestic public	001168
evaluation of improved surface coal	mine overburden handling and coal	001104
and increase of perennial forbs for	mine spoil reclamation in the	001207
remove surface runoff from graded	mine spoils* of stable channels to	001087
Scenarios for utilizing process and	mine waters for aquatic habitat	001099
Creek Coal Company's proposed coal	mine* Impact Statement--Spring	001093
with a Montana coal strip	mine* activity in waters associated	001089
-proposed MONTCO coal strip	mine*Environmental Impact Statement-	001094
mining #Reconnaissance study of	mine-water temperatures in hardrock	001156
-Westmoreland Absaloka Coal	Mine expansion into section 36*	001102
-Peabody Coal Company's Big Sky	Mine extension* Impact statement-	001101
analysis* #Decker	Mine proposals: a demographic	001095
-Shell's proposed Pearl Coal	Mine*Environmental impact statement-	001103
to predict groundwater quality in	mined lands* of possible techniques	001092
conservation #Domestic mining and	mineral and mineral fuel	001179
access restrictions for key	mineral commodities: analysis of	001175
regulatory framework: effects on	mineral exploration and mine	001168
#Domestic mining and mineral and	mineral fuel conservation	001179
access requirements for	minerals exploration and	001177
MILS)--Wyoming* #	Minerals Industry Location System (	001178
of pre-project commitments to	minimize adverse environmental	001130
conservation fellowships* #Domestic	mining and mineral and mineral fuel	001179
mine-water temperatures in hardrock	mining districts of Montana* of	001156
manuals* #Surface	mining effects and stipulations	001091
of coal related energy development:	mining impacts* #Health implications	001090
of surface and underground coal	mining in western states* #Taxation	001107
#Taxation of coal	mining*	001108
adapted to areas disturbed by strip	mining* and productivity of species	001088
particulate air pollution in the	Missoula Valley* #Wood burning and	001197
environmental #Water for energy,	Missouri River reservoirs--	001218
#Upper	Missouri River Basin Level B study*	001189
energetics and relationships in a	mixed-grass ecosystem* #Ecological	001202
#Engineering support: retorting of	mixtures of coal and oil shale*	001085
#Alternative energy systems for	mobile homes*	001135
#Montana energy	model*	001170
reverse and forward #Mathematical	modeling and laboratory study of	001116
hydrology #Analytical and numerical	modeling, transient analysis and	001082
materials of importance to	molten carbonate fuel cells*	001188
feedstocks via a combination of	molten salt catalysis and solvent	001084
#Wind	monitoring project*	001163
in waters associated with a	Montana coal strip mine* activity	001089
Bureau of Reclamation projects in	Montana concerning the execution of	001130
#	Montana energy model*	001170
#Feasibility of ethanol from	Montana grain*	001129
heating facility and #	Montana solar-assisted water	001184
#Wind-electric power generation in	Montana*	001160
heated swimming pool in Shelby,	Montana* #Solar	001151
siting criteria for the State of	Montana* for establishing	001205
program for state buildings in	Montana* #Energy conservation	001193
and industrial resources of	Montana* agricultural, domestic,	001127
group at shallow depth in eastern	Montana* potential of the Madison	001152
facility in White Sulfur Springs,	Montana* home and present hospital	001157
Basin/Idaho, Oregon, Washington,	Montana* potential--Columbia River	001129
in hardrock mining districts of	Montana* of mine-water temperatures	001156
for Valley Industrial Park,	Montana* redevelopment alternatives	001190
Madison River Valleys, southwestern	Montana*parts of Red Rock Creek and	001153
and training site, Region 5 (Idaho,	Montana, Oregon, Washington, and	001132
Impact Statement--proposed	MONTCO coal strip mine*	001094
program* #Rocky	Mountain regional energy assessment	001169
#Microtopological investigation of	nahcolite and its thermal	001121
#Upgrading of Green River shale oil	naphtha by mild oxidation*	001120

key mineral commodities: analysis #	National access restrictions for	001175
#	National Coal Policy Project*	001109
of the Ashland Divison, Custer	National Forest* on grasslands	001201
and development, Flathead	National Forest--USDA Forest	001115
Valley Station near Beulah,	ND* Power Cooperative's Antelope	001209
of Coyote Station near Beulah,	ND* #Environmental impact analysis	001208
from energy developers: a	negotiating guide for small	001171
#	Northern tier pipeline system*	001113
aquifer-system analysis* #	Northern Great Plains regional	001212
for mine spoil reclamation in the	Northern Great Plains* forbs	001207
#	Northern Tier crude oil study*	001112
Environmental Impact Statement-- #	Northern Tier Pipeline Project (	001114
Power Administration in the Pacific	Northwest power supply system,	001164
for the development of geothermal #	Northwest regional planning support	001159
energy future for the Pacific	Northwest* scenario: electrical	001184
requirements for the Pacific	Northwest: long range, 1985--2020*	001166
analysis and #Analytical and	numerical modeling, transient	001082
heating system for the new	nursing home and present hospital	001157
#Evaluation of liquids from shale	oil and coal syncrudes for	001086
*Coal Creek State Forest: proposed	oil and gas leases (environmental	001220
#Upgrading of Green River shale	oil naphtha by mild oxidation*	001120
retorting of mixtures of coal and	oil shale* #Engineering support:	001085
#Northern Tier crude	oil study*	001112
exploration and development, #	Oil and gas lease applications	001115
#	ORD and CD of chiral alkanes*	001118
site, Region 5 (Idaho, Montana,	Oregon, Washington, and Wyoming)*	001132
-Columbia River Basin/Idaho,	Oregon, Washington, Montana*	001129
of improved surface coal mine	overburden handling and coal	001104
River shale oil naphtha by mild	oxidation* #Upgrading of Green	001120
Power Administration in the	Pacific Northwest power supply	001164
electrical energy future for the	Pacific Northwest* scenario:	001184
corridor requirements for the	Pacific Northwest: long range, 1985-	001166
#Energy	park and demonstration devices*	001180
heated waters of Yellowstone	Park* adapted to the geothermally	001158
kilovolt transmission lines: #Clyde	Park-Dillon 161 kilovolt and 69	001219
alternatives for Valley Industrial	Park, Montana* of redevelopment	001190
power supply system, including its	participation in the hydro-thermal	001164
Missoula Valley* #Wood burning and	particulate air pollution in the	001197
for reclaiming deteriorated asphalt	pavement* oil and coal syncrudes	001086
#Environmental impact statement--	Peabody Coal Company's Big Sky Mine	001101
impact statement--Shell's proposed	Pearl Coal Mine* #Environmental	001103
practices for establishment of	perennial and annual vegetation on	001206
#Selection and increase of	perennial forbs for mine spoil	001207
the #Analysis and evaluation of the	permit application: Units 1--3 of	001165
geothermal potential of the #	Phase zero study results--	001152
heating and domestic hot water/	photovoltaic/wind electric system*	001134
for Basin Electric #Analysis of	physical and biological environment	001209
aqueous effluents derived from in #	Phytotoxicity and plant response to	001222
CONSOL CO2 coal gasification	pilot plant, Rapid City, South	001083
#Northern tier	pipeline system*	001113
Impact Statement-- #Northern Tier	Pipeline Project (Environmental	001114
and coal slurry and pneumatic	pipelines*truck, belt, rail, barge,	001105
analysis* #Northern Great	Plains regional aquifer-system	001212
reclamation in the Northern Great	Plains* forbs for mine spoil	001207
#Feasibility and pre-engineering	planning of geothermal heating	001157
coal energy development impact	planning reference system:	001110
coal energy development impact	planning reference system: factbook*	001097
coal energy development impact	planning reference system: impact	001096
program environmental statement and	planning report* program--a draft	001164
development of #Northwest regional	planning support for the	001159
and guidelines for local land use	planning*#Statewide goals, policies	001196
derived from in #Phytotoxicity and	plant response to aqueous effluents	001222
CONSOL CO2 coal gasification pilot	plant, Rapid City, South Dakota*	001083
uranium spoils* #Techniques for	planting shrubs and trees on	001203
rail, barge, and coal slurry and	pneumatic pipelines*of truck, belt,	001105
land use planning*#Statewide goals,	policies and guidelines for local	001196
accommodate #Highway relocation	policy and procedures to	001195
#National Coal	Policy Project*	001109
#Wood burning and particulate air	pollution in the Missoula Valley*	001197
#Solar heated swimming	pool in Shelby, Montana*	001151
of Engineers and Bureau of #Ex	post facto analysis of Army Corps	001130
#Reconnaissance study of geothermal	potential in the upper parts of Red	001153
zero study results--geothermal	potential of the Madison group at	001152
survey of low-head hydroelectric	potential--Columbia River Basin/	001129
requirements for the Pacific #	Potential energy corridor	001166
#	Powder River Basin report (draft)*	001173
#Wind-electric	power generation in Montana*	001160
participation in the hydro-thermal	power program--a draft program	001164
in the Pacific Northwest	power supply system, including its	001164
Northwest #Role of the Bonneville	Power Administration in the Pacific	001164
environment for Basin Electric	Power Cooperative's Antelope Valley	001209
#Homemade wind	powered air compressor*	001162
perennial and #Flexible cultural	practices for establishment of	001206
geothermal heating #Feasibility and	pre-engineering planning of	001157
Montana concerning the execution of	pre-project commitments to minimize	001130
of possible techniques to	predict groundwater quality in	001092
home heating and domestic hot water	preheating retrofit system* #Solar	001139
home heat and domestic hot water	preheating/heat pump backup* #Solar	001141
heating* #Solar domestic hot water	preheating/home heating wood backup	001138
of kerogen under elevated	pressure* #Thermal decomposition	001119
development on domestic public and	private lands* exploration and mine	001168
#Establishment, composition, and	productivity of species adapted to	001088
and its thermal decomposition	products*investigation of nahcolite	001121
concerning the execution of pre-	project commitments to minimize	001130
Reservation* #Wind energy research	project for the Fort Belknap Indian	001161
#Coal board impact identification	project*	001100
#Renewable energy demonstration	project*	001131
#Solar home heating	project*	001142
#Solar hot water heating	project*	001150
#Wind monitoring	project*	001163
#Energy research	project*	001176
Statement-- #Northern Tier Pipeline	Project (Environmental Impact	001114
#National Coal Policy	Project*	001109
Engineers and Bureau of Reclamation	projects in Montana concerning the	001130
#Legal and institutional study to	promote development of renewable	001181
#Decker Mine	proposals: a demographic analysis*	001095
#Study of geothermal energy	prospects in western states*	001155
and mine development on domestic	public and private lands*	001168
domestic hot water preheating/heat	pump backup* #Solar home heat and	001141
techniques to predict groundwater	quality in mined lands* of possible	001092
detection #Design and support for	radioactive tracer injection and	001117
analysis of truck, belt,	rail, barge, and coal slurry and	001105

PERMUTED TITLE INDEX

CO2 coal gasification pilot plant,	Rapid City, South Dakota* CONSOL	001083
*Generic	rate study*	001183
shale oil and coal syncrudes for	reclaiming deteriorated asphalt	001086
of perennial forbs for mine spoil	reclamation in the Northern Great	001207
of the extent of state control over	reclamation on federal land* study	001111
Corps of Engineers and Bureau of	Reclamation projects in Montana	001130
and stream sediment	reconnaissance for uranium*	001125
potential in the upper parts of *	Reconnaissance study of geothermal	001153
temperatures in hardrock mining *	Reconnaissance study of mine-water	001156
potential in the upper parts of	Red Rock Creek and Madison River	001153
*Evaluation and implementation of	redevelopment alternatives for	001190
molten salt catalysis and solvent	refining technologies* of	001084
research and training site,	Region 5 (Idaho, Montana, Oregon,	001132
*Northern Great Plains	regional aquifer-system analysis*	001212
*Rocky Mountain	regional energy assessment program*	001169
development of *Northwest	regional planning support for the	001158
survey of waters of western coal	regions* *Geochemical	001216
of vegetation in the western energy	regions* *Geochemical survey	001200
mineral exploration and *Federal	regulatory framework: effects on	001168
ecosystem*Ecological energetics and	relationships in a mixed-grass	001202
accommodate energy *Highway	relocation policy and procedures to	001195
mine *Design of stable channels to	remove surface runoff from graded	001087
center for the New *Year-round	renewable energy demonstration	001170
study to promote development of	renewable energy* and institutional	001181
project* *	Renewable energy demonstration	001131
5 (*Solar energy meteorological	research and training site, Region	001132
Belknap Indian *Wind energy	research project for the Fort	001161
*Energy	research project*	001176
demonstration program (*Coal	research, development and	001081
project for the Fort Belknap Indian	Reservation* *Wind energy research	001161
Laramie River Station, Grayrocks	Reservoir--transmission lines and	001165
*Water for energy, Missouri River	reservoirs--environmental impact	001218
*Electrical system load survey:	residential class*	001167
system* *	Residential solar water heating	001187
hydroelectric potential--Columbia *	Resource survey of low-head	001129
domestic, and industrial	resources of Montana* agricultural,	001127
*Study of energy information needs,	resources, and costs*	001172
derived *Phytotoxicity and plant	response to aqueous effluents	001222
commodities: *National access	restrictions for key mineral	001175
oil shale* *Engineering support:	retorting of mixtures of coal and	001085
and domestic hot water preheating	retrofit system*Solar home heating	001139
modeling and laboratory study of	reverse and forward combustion in	001116
*	Reversion of irrigated lands*	001217
impact* *Water for energy, Missouri	River reservoirs--environmental	001218
oxidation* *Upgrading of Green	River shale oil naphtha by mild	001120
*Powder	River Basin report (draft)*	001173
*Upper Missouri	River Basin Level B study*	001189
hydroelectric potential--Columbia	River Basin/Idaho, Oregon,	001129
Units 1--3 of the Laramie	River Station, Grayrocks Reservoir--	001165
parts of Red Rock Creek and Madison	River Valleys, southwestern Montana*	001153
of the Ashland Divison, Custer *Off	road vehicle impact on grasslands	001201
*Bench scale creep tests on	rock salt*	001223
potential in the upper parts of Red	Rock Creek and Madison River	001153
assessment program* *	Rocky Mountain regional energy	001169
demonstration center for the *Year-	round renewable energy	001170
stable channels to remove surface	runoff from graded mine spoils* of	001087
-Spring Creek Coal Company'	s proposed coal mine* Statement-	001093
impact statement--Shell'	s proposed Pearl Coal Mine*	001103
Basin Electric Power Cooperative'	s Antelope Valley Station near	001209
statement--Peabody Coal Company'	s Big Sky Mine extension* impact	001101
*Assessment of environmental,	safety and social impacts of MHD	001186
via a combination of molten	salt catalysis and solvent refining	001084
*Bench scale creep tests on rock	salt*	001223
and forward combustion in tar	sands* laboratory study of reverse	001116
*Bench	scale creep tests on rock salt*	001223
system* *Small-	scale hydroelectric energy supply	001192
for the Pacific *Alternative	scenario: electrical energy future	001188
mine waters for aquatic habitat *	Scenarios for utilizing process and	001099
*Hydrogeochemical and stream	sediment reconnaissance for uranium*	001125
forbs for mine spoil reclamation *	Selection and increase of perennial	001207
National Forest--USDA Forest	Service environmental impact	001115
*Evaluation of liquids from	shale oil and coal syncrudes for	001086
*Upgrading of Green River	shale oil naphtha by mild oxidation*	001120
of mixtures of coal and oil	shale* support: retorting	001085
potential of the Madison group at	shallow depth in eastern Montana*	001152
*Solar heated swimming pool in	Shelby, Montana*	001151
*Environmental impact statement--	Shell's proposed Pearl Coal Mine*	001103
*Solar heated carpenter	shop*	001144
*Techniques for planting	shrubs and trees on uranium spoils*	001203
research and training	site, Region 5 (Idaho, Montana,	001132
of a methodology for establishing	siting criteria for the State of	001205
and hydrology studies of in	situ coal gasification recovery	001082
aqueous effluents derived from in	situ fossil fuel extraction	001122
effluents *Characterization of in	situ fossil fuel processing	001123
of aqueous effluents from in	situ fossil fuel processing	001221
aqueous effluents derived from in	situ fossil fuel processing* to	001222
aqueous effluents derived from in-	situ fossil fuel processing* with	001128
-Peabody Coal Company's Big	Sky Mine extension*impact statement-	001101
truck, belt, rail, barge, and coal	slurry and pneumatic pipelines* of	001105
of environmental, safety and	social impacts of MHD technology*	001186
strategies for alleviation of	socioeconomic impacts in seven	001191
effluents derived *Interactions of	soil microorganisms with aqueous	001128
*Laboratory heated by	solar energy*	001140
Active solar hot water heating of a	solar greenhouse* *	001137
greenhouse* *Active	solar hot water heating of a solar	001137
*Construction and installation of	solar hot water systems*	001148
*Residential	solar water heating system*	001187
facility and *Montana	solar-assisted water heating	001180
home heating wood backup heating* *	Solar domestic hot water preheating/	001138
research and training site, Region *	Solar energy meteorological	001132
*	Solar heated carpenter shop*	001144
*	Solar heated greenhouse*	001145
Shelby, Montana* *	Solar heated swimming pool in	001151
water/photovoltaic/wind electric *	Solar heating and domestic hot	001134
building* *	Solar heating of a small commercial	001143
water preheating/heat pump backup* *	Solar home heat and domestic hot	001141
water preheating retrofit system* *	Solar home heating and domestic hot	001139
*	Solar home heating project*	001142
*	Solar hot water heating project*	001150
United Methodist Church* *	Solar space heating in Fort Benton	001135
*Weather station for	Solar Heights Subdivision*	001133
demonstration* *	Solar-electric crop drying	001135

PERMUTED TITLE INDEX

of molten salt catalysis and	solvent refining technologies*	001084
impact planning reference system:	sourcebook* coal energy development	001110
energy from the Madison #Western	South Dakota usage of geothermal	001159
pilot plant, Rapid City,	South Dakota* CO2 coal gasification	001083
Creek and Madison River Valleys,	southwestern Montana* of Red Rock	001153
Methodist Church* #Solar	space heating in Fort Benton United	001135
composition, and productivity of	species adapted to areas disturbed	001088
#Aquatic endangered	species*	001211
processing effluents by microwave	spectroscope*of in situ fossil fuel	001123
of perennial forbs for mine	spoil reclamation in the Northern	001207
shrubs and trees on uranium	spoils* #Techniques for planting	001203
surface runoff from graded mine	spoils*of stable channels to remove	001087
#Environmental Impact Statement--	Spring Creek Coal Company's	001093
hospital facility in White Sulfur	Springs, Montana* home and present	001157
runoff from graded mine #Design of	stable channels to remove surface	001087
-a draft program environmental	statement and planning report*	001164
Forest Service environmental impact	statement* National Forest--USDA	001115
reservoirs--environmental impact	statement* energy, Missouri River	001218
lines: environmental impact	statement* 69 kilovolt transmission	001219
gas leases (environmental impact	statement)*Forest: proposed oil and	001220
Big Sky Mine #Environmental impact	statement--Peabody Coal Company's	001101
Coal Mine* #Environmental impact	statement--Shell's proposed Pearl	001103
Coal Mine #Environmental impact	statement--Westmoreland Absaloka	001102
program (Environmental Impact	Statement)* and demonstration	001081
strip mine* #Environmental Impact	Statement--proposed MONTCO coal	001094
Company's #Environmental Impact	Statement--Spring Creek Coal	001093
Project (Environmental Impact	Statement--State)* Tier Pipeline	001114
guidelines for local land use	# Statewide goals, policies and	001196
Subdivision* #Weather	station for Solar Heights	001133
impact analysis of Coyote	Station near Beulah, ND*	001208
Power Cooperative's Antelope Valley	Station near Beulah, ND* Electric	001209
Units 1--3 of the Laramie River	Station, Grayrocks Reservoir--	001165
affecting habitats in Wyoming*	# Status of land use changes	001210
#Surface mining effects and	stipulations manuals*	001091
socioeconomic impacts in #Financial	strategies for alleviation of	001191
uranium* #Hydrogeochemical and	stream sediment reconnaissance for	001125
Statement--proposed MORTCO coal	strip mine* #Environmental Impact	001094
associated with a Montana coal	strip mine*cycle activity in waters	001089
adapted to areas disturbed by	strip mining* of species	001088
and annual vegetation on topsoiled	stripmines* of perennial	001206
#Wood heated underground	structure*	001194
analytical studies of micron and	sub-micron fly ash from coal-fired	001106
gasification pilot plant, Rapid	# Subcontract CONSOL CO2 coal	001083
#Weather station for Solar Heights	Subdivision*	001133
associated with a #Microbial	sulfur cycle activity in waters	001089
present hospital facility in White	Sulfur Springs, Montana* home and	001157
#Small-scale hydroelectric energy	supply system*	001192
in the Pacific Northwest power	supply system, including its	001164
injection and detection #Design and	support for radioactive tracer	001117
#Northwest regional planning	support for the development of	001154
coal and oil shale* #Engineering	support: retorting of mixtures of	001085
in western states* #Taxation of	surface and underground coal mining	001107
#Design and evaluation of improved	surface coal mine overburden	001104
Design of stable channels to remove	surface runoff from graded mine	001087
micron and sub-micron fly ash from	# Surface analytical studies of	001106
stipulations manuals*	# Surface mining effects and	001091
production from #Comprehensive	survey of biological methane	001127
potential--Columbia River #Resource	survey of low-head hydroelectric	001129
energy regions* #Geochemical	survey of vegetation in the western	001200
regions* #Geochemical	survey of waters of western coal	001216
#Electrical system load	survey: residential class*	001167
dams and diversions in the West*	# Survey of existing conditions below	001215
#Solar heated	swimming pool in Shelby, Montana*	001151
of liquids from shale oil and coal	syncrudes for reclaiming	001086
Great Plains regional aquifer-	system analysis* #Northern	001212
planning of geothermal heating	system for the new nursing home and	001157
class* #Electrical	system load survey: residential	001167
#Northern tier pipeline	system*	001113
#Residential solar water heating	system*	001147
scale hydroelectric energy supply	system* #Small-	001192
environment information transfer	system* and testing of an energy-	001224
water/photovoltaic/wind electric	system* heating and domestic hot	001134
hot water preheating retrofit	system* home heating and domestic	001139
tracer injection and detection	system* and support for radioactive	001117
the Pacific Northwest power supply	system, including its participation	001164
impact planning reference	system: factbook*energy development	001097
impact planning reference	system: impact evaluation guide*	001095
impact planning reference	system: sourcebook* development	001110
#Minerals Industry Location	System (MILS)--Wyoming*	001178
#Alternative energy	systems for mobile homes*	001136
#Habitat enhancement--aquatic	systems*	001214
and installation of solar hot water	systems* #Construction	001148
processing technologies on aquatic	systems* from in situ fossil fuel	001221
and legal aspects of uranium mill	tailings management* #Financial	001126
reverse and forward combustion in	tar sands* and laboratory study of	001116
	# Taxation of coal mining*	001108
coal mining in western states*	# Taxation of surface and underground	001107
#Western Energy and Land Use	Team (WELUT)*	001199
from in situ fossil fuel processing	technologies on aquatic systems*	001221
from in situ fossil fuel extraction	technologies* effluents derived	001122
salt catalysis and solvent refining	technologies* combination of molten	001084
safety and social impacts of MHD	technology* of environmental,	001186
to #Thermodynamic analysis of high	temperature materials of importance	001188
#Reconnaissance study of mine-water	temperatures in hardrock mining	001156
investigation of nahcolite and its	thermal decomposition products*	001121
its participation in the hydro-	thermal power program--a draft	001164
under elevated pressure*	# Thermal decomposition of kerogen	001119
temperature materials of	# Thermodynamic analysis of high	001188
#Northern	tier pipeline system*	001113
#Northern	Tier crude oil study*	001112
Environmental Impact #Northern	Tier Pipeline Project (	001114
perennial and annual vegetation on	topsoiled stripmines* of	001206
#Design and support for radioactive	tracer injection and detection	001117
energy meteorological research and	training site, Region 5 (Idaho,	001132
an energy-environment information	transfer system* and testing of	001224
#Analytical and numerical modeling,	transient analysis and hydrology	001082
River Station, Grayrocks Reservoir--	transmission lines and associated	001165
Dillon 161 kilovolt and 69 kilovolt	transmission lines: environmental	001219
for minerals #Assessment of	transportation access requirements	001177
and engineering #Comparative coal	transportation costs: an economic	001105
#Techniques for planting shrubs and	trees on uranium spoils*	001203
heated #Ecological genetics of	trout adapted to the geothermally	001158

and engineering analysis of	truck, belt, rail, barge, and coal	001105
states• ♦Taxation of surface and	underground coal mining in western	001107
♦Wood heated	underground structure•	001194
♦Solar space heating in Fort Benton	United Methodist Church•	001135
of the permit application:	Units 1--3 of the Laramie River	001165
naphtha by mild oxidation•	♦ Upgrading of Green River shale oil	001120
of geothermal potential in the	upper parts of Red Rock Creek and	001153
study•	♦ Upper Missouri River Basin Level B	001189
♦Financial and legal aspects of	uranium mill tailings management•	001126
for planting shrubs and trees on	uranium spoils• ♦Techniques	001203
stream sediment reconnaissance for	uranium• ♦Hydrogeochemical and	001125
Flathead National Forest--	USDA Forest Service environmental	001115
	♦ Utility study•	001182
of redevelopment alternatives for	Valley Industrial Park, Montana•	001190
Power Cooperative's Antelope	Valley Station near Beulah, ND•	001209
air pollution in the Missoula	Valley•Wood burning and particulate	001197
of Red Rock Creek and Madison River	Valleys, southwestern Montana•parts	001153
regions• ♦Geochemical survey of	vegetation in the western energy	001200
of perennial and annual	vegetation on topsoiled stripmines•	001206
Ashland Division, Custer ♦Off road	vehicle impact on grasslands of the	001201
Region 5 (Idaho, Montana, Oregon,	Washington, and Wyoming)• site,	001132
Columbia River Basin/Idaho, Oregon,	Washington, Montana• potential--	001129
♦Montana solar-assisted	water heating facility and	001149
♦Active solar hot	water heating of a solar greenhouse•	001137
♦Solar hot	water heating project•	001150
♦Residential solar	water heating system•	001147
Solar home heating and domestic hot	water preheating retrofit system• ♦	001139
♦Solar home heat and domestic hot	water preheating/heat pump backup•	001141
backup heating• ♦Solar domestic hot	water preheating/home heating wood	001138
and installation of solar hot	water systems• ♦Construction	001148
♦Reconnaissance study of mine-	water temperatures in hardrock	001156
♦Microbiology of black	water•	001213
♦Solar heating and domestic hot	water/photovoltaic/wind electric	001134
reservoirs--environmental impact	♦ Water for energy, Missouri River	001218
♦Microbial sulfur cycle activity in	waters associated with a Montana	001089
for utilizing process and mine	waters for aquatic habitat	001099
♦Geochemical survey of	waters of western coal regions•	001216
adapted to the geothermally heated	waters of Yellowstone Park•of trout	001158
Subdivision•	♦ Weather station for Solar Heights	001133
♦Western Energy and Land Use Team (	WELUT)•	001199
below dams and diversions in the	West•♦Survey of existing conditions	001215
♦Geochemical survey of waters of	western coal regions•	001216
survey of vegetation in the	western energy regions•♦Geochemical	001200
of geothermal energy prospects in	western states• ♦Study	001155
of socioeconomic impacts in seven	western states• for alleviation	001191
and underground coal mining in	western states•♦Taxation of surface	001107
impact planning reference system:	♦ Western coal energy development	001096
impact planning reference system:	♦ Western coal energy development	001097
impact planning reference system:	♦ Western coal energy development	001110
WELUT)•	♦ Western Energy and Land Use Team (	001199
demonstration center for the New	Western Energy Show• energy	001174
geothermal energy from the Madison	♦ Western South Dakota usage of	001159
♦Environmental impact statement--	Westmoreland Absaloka Coal Mine	001102
and present hospital facility in	White Sulfur Springs, Montana• home	001157
and domestic hot water/photovoltaic/	wind electric system•♦Solar heating	001134
♦Homemade	wind powered air compressor•	001162
the Fort Belknap Indian Reservation	♦ Wind energy research project for	001161
	♦ Wind monitoring project•	001163
Montana•	♦ Wind-electric power generation in	001160
hot water preheating/home heating	wood backup heating•♦Solar domestic	001138
pollution in the Missoula Valley•	♦ Wood burning and particulate air	001197
	♦ Wood heated underground structure•	001194
Industry Location System (MILS)--	Wyoming• ♦Minerals	001178
use changes affecting habitats in	Wyoming• ♦Status of land	001210
Montana, Oregon, Washington, and	Wyoming)• site, Region 5 (Idaho,	001132
the geothermally heated waters of	Yellowstone Park• trout adapted to	001158